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INTERNATIONAL CLINICS:

A QUARTERLY OF CLINICAL LECTURES

ON

MEDICINE, NEUROLOGY, SURGERY, GYNÆCOLOGY, OBSTETRICS, OPHTHALMOLOGY, LARYNGOLOGY, PHARYNGOLOGY, RHINOLOGY, OTOLOGY, AND DERMATOLOGY,

AND SPECIALLY PREPARED ARTICLES ON TREATMENT AND DRUGS.

BY PROFESSORS AND LECTURERS IN THE LEADING MEDICAL COLLEGES OF THE UNITED STATES, GERMANY, AUSTRIA, FRANCE, GREAT BRITAIN, AND CANADA.

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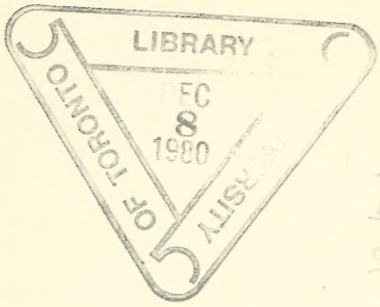

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Drugs and Remedial Agents.

SUBCONJUNCTIVAL INJECTIONS IN CERTAIN DISEASES OF THE EYE.

BY DUNBAR ROY, A.B., M.D.,

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CHIBRET said at the Eighth International Ophthalmological Congress in regard to syphilitic affections of the eye: "Mercury alone is always successful; potassium iodide alone, never." With some restrictions, we are in full accord with this statement.

The subject of subconjunctival injections for the benefit and cure of certain diseases of the eye has in the last few years received considerable attention, and made for itself a decided place in the *rôle* of ocular therapeutics. While it is true that it has not excited such wide-spread interest as some other points in ocular therapeutics, it is equally true that it is well worthy of attention. This latter statement is made not only from some knowledge of the literature bearing upon the subject, but also from personal clinical observation and experience. In some suppurative conditions of the eye, subconjunctival injections have obtained for me results which I have never obtained with any other method.

No procedure introduced by a reputable physician for the relief of some diseased portion of the human economy should be relegated to oblivion without its efficacy having been tested to see whether there exists the real value claimed for it by its advocates. The day has long since passed when we may substitute theoretical reasoning for clinical facts, and those physicians who denounce "new innova-

tions" as unscientific and non-therapeutic simply on the grounds of a lack of personal clinical experience must be classed with other paleozoic fossils whose sphere of usefulness has long since ceased to exist. Subconjunctival injections had been used many years ago by Rothmund and Segondi. Professor Raymond, of Turin, and his followers were the first to advocate the therapeutic use of subconjunctival sublimate injections,—this author having used it to subdue sympathetic inflammation,—in that he found the results just as satisfactory and far less dangerous in making the injections beneath the conjunctiva instead of into the vitreous as had previously been done.

However, it is due Professor Abadie, of Paris, and especially his pupil Darier, for having extended the use of these injections to a great many other diseases of the eye, and for having brought the method prominently before the ophthalmic profession. Since 1888 Darier has been an indefatigable worker in this line of ocular therapeutics, and has written voluminously on the subject.

The question naturally arises, Why should this method of subconjunctival injections be preferable to other and more usual ways of treatment? The advocates of this method must be divided into (1) those using some form of mercury as a germicide in their injections, and (2) those using milder injections, such as the normal salt solution. Both sides claim equally good results, but differ as to the *rationale* of the results obtained.

The value of mercury in the treatment of a great many diseases of the eye, when not even dependent upon a syphilitic basis, has long been recognized. The question is whether subconjunctival injections of some salt of mercury are more potent when used in this manner than when given by the older and more universally recognized methods.

The first class of advocates hold this method of treatment is valuable in both syphilitic and non-syphilitic affections of the eye, claiming that the antiseptic and germicidal effect of the mercury is more potent when thus localized near the tissues involved than when introduced into the general circulation. The experiment of Professor Pflüger, of Berne, has demonstrated that "after subconjunctival injections of a bichloride solution, the salt is found in the cornea, aqueous humor, suprachoroidal spaces, vitreous humor, and the superficial layers of the lens. The mercuric chloride reaches the tissues of the eye before being taken up by the general circulation."

On the other hand, Bach and Hess claim that in their experiments they were unable to detect any mercury whatever in the interior of the eye. Carl Mellinger and Domenico Bossalino, of Basle, have made some experiments to determine whether the substances injected subconjunctivally really entered the eye. He used sterilized mixtures of China ink, and found "that particles did follow the large lymph-channels of the whole globe and optic nerve, and not only were the eye and nerve surrounded by such, but the suprachoroidal spaces and intervaginal spaces as well." (Bernstein.)

Darier, with a host of other observers, holds that the results obtained through the subconjunctival injections are due to the germicidal action of the mercury, while Mellinger says that the injections stimulate lymphatic circulation to greater rapidity, and therefore cause a reabsorption and elimination of the pathologic process. The latter therefore simply uses injections of the normal salt solution, claiming to get equally as good results as when the salts of mercury are used.

These experiments certainly prove that the substances injected reach the tissues of the eye very much more rapidly than when administered by any other method.

Another reason why this method of treatment is valuable is the fact that when it is successful its results are very much more rapid and marked than when any other line of treatment is used. For instance, Drs. Syrosso and Scalina, before the Italian Congress of Ophthalmology in 1895, reported their experiences with the use of the subconjunctival injections of mercury as follows: In corneal ulcers recovery was obtained with a single injection in forty-six cases, with two injections in eight cases, four very severe cases with three injections. My own experience compels me to say that in suppurative processes about the cornea and iris this method of treatment is far superior to any I have ever used.

In what Pathologic Conditions of the Eye has this Method been used?—Darier from the very first called attention to the fact that this method of treatment was beneficial especially in infected processes, although it has been used up to the present for nearly every inflammatory condition (acute and chronic) of the eye.

Before the International Ophthalmological Congress in 1895, this author laid down what he considered the indications for the use of this method:

1. As being the most powerful and most promptly acting antiseptic in traumatic and operative infection, and also in infectious keratitis with or without hypopyon.

2. The presence of torpid parenchymatous keratitis, diseases of the choroid and plastic iritis, in cases where there is no marked venous stasis.

3. As an antisyphilitic. The principal contraindication consists in a venous stasis of the circumcorneal vessels, as in this case absorption takes place very slowly, and the injections produce an irritation which is more violent than dangerous.

Considering now the various pathologic conditions of the eye in which different observers have found this method of benefit, we have:

Diseases of the Cornea.—With the exception possibly of Abadie, no ophthalmologist has used the method of subconjunctival injections to the exclusion of other remedies. In corneal ulcerations the injections have probably found their greatest utility, certainly in my own experience. However, we hold that the injections should never be resorted to except where the ulceration shows no tendency to heal under the application of atropine and hot fomentations, for subconjunctival injections are not entirely free from pain. In speaking of injections, we mean a solution of some salt of mercury; for we are firmly convinced that the use of such solutions is productive of the best results.

A case in question shows the value of this method of treatment: Miss F., aged nineteen, from an adjoining State, was sent to me by her family physician for the purpose of having her right eye enucleated. The history was as follows: Three months ago she was struck in the right eye by a piece of wood. A few days later the eye became inflamed, and this continued to increase in severity, with so much pain that for the last three weeks the patient has been compelled to take morphine every night in order to gain some sleep.

On examination, which was very difficult on account of the intense photophobia, the following condition was found: the upper two-thirds of the cornea were ulcerated and necrotic. There was intense circumcorneal injection, and vision was only the perception of light. Patient complained of the most intense pain. She was anxious to have the eye removed because of this last condition, and panophthalmitis certainly seemed imminent. She was placed in the hospital for one week, and during that time had a special nurse day

and night, while all the recognized remedies were used without effect. At the end of this time the patient decided she would rather be treated at the home of some friends. She was brought to my office in a carriage, and at the first visit I made a large subconjunctival injection of bichloride of mercury, 1–1000. The next day the report was that she had rested better the night before than for two months and was freer from pain. Examination showed a decided change for the better in the corneal ulceration. Atropine and hot fomentations were used at home, and every third day an injection was made. Later, when the ulceration had practically healed, leaving only the opacity, the injections were stopped, and yellow ointment with massage was substituted. Patient continued to improve, and returned home in one month with vision equal 1 2. A later communication informed me that vision was almost as good as in the uninjured eye.

A great many writers both in this country and in Europe, especially the latter, have reported most favorable results from the use of injections in diseases of the cornea.

B. R. Gepner, of Warsaw, thus tabulates his experience:

1. Central corneal ulcer with hypopyon. One-third of the anterior chamber filled with pus; severe ciliary pain. Patient had been unsuccessfully treated with atropia, iodoform, and hot applications for three weeks. Under injections, in three days, the parts have been entirely restored.

2. Central necrotic ulcer due to traumatism and infection. Anterior chamber filled with pus. In eight days, under injections, the parts were entirely healed.

Besides the case reported, I have used this method in numerous other cases of corneal ulceration with and without hypopyon, and always with the most gratifying results. In interstitial keratitis, the injections have been used with both favorable and unfavorable results.

Pennon treated twenty-three cases with good results.

Gepner's results were variable, and not so pronounced as in the ulcerative forms.

Deutschman says "that we can often shorten the treatment to four weeks, while it usually takes twice as long by other methods." My own experience, limited to six cases, does not lead me to be so enthusiastic as in other pathologic conditions.

Siklossy's experience (*Annales d'Oculistique*) is worthy to be mentioned. He recommends the use of subconjunctival injections in conjunctival infections, even though acute. He has used the treatment with success in acute blennorrhœic conjunctivitis. It is more particularly in trachoma that the injections seem to produce the best and quickest results, especially if pannus exists, even though the pannus be complicated with ulcerative lesions of the cornea.

The Iris.—In iritis, both acute and chronic, and especially when dependent upon a syphilitic basis, injections have been used with almost universally favorable results. This method of treatment finds its best indication in cases of iritis where there are extensive adhesions, and after the violence of the inflammation has subsided. A decided indication for the employment of this method is when the attack is unusually prolonged and the adhesions do not yield to the mydriatic.

Gepner finds that the best results are always obtained when there are extensive adhesions.

Pennon has treated twenty-eight cases with universally favorable results.

Veasey, of Philadelphia, has been pleased with his results, although both he and de Schweinitz use preferably the normal salt solution, claiming equally as good results as when the mercuric chloride was used.

Schmidt-Rimpler also speaks most favorably of this treatment. In two cases of gummatous iridocyclitis, where the gumma had already begun to bulge the sclerotic coat, I used the bichloride injections with most beautiful results. Three injections succeeded in abating all the symptoms,—the gummata disappearing, pain being relieved, and all the symptoms were reduced to a case of mild iritis, soon cured with the use of atropine and hot fomentations.

In such cases as these I have come to look upon the injection of a bichloride solution almost as specific and far superior to all other methods.

In iridochoroiditis, the results have been equally favorable. Deutschman has used injections in such cases, exclusive of all other remedies, claiming that the iritic adhesions were broken, and that there was a rapid recovery.

Choroid and Retina.—In choroiditis and retinitis, both acute and chronic, the results have been on the whole favorable. It must

be remembered, however, that it is a matter almost of impossibility to restore the choroid and retina to a perfectly normal condition after they have once been inflamed, but a great deal can be done towards the accomplishment of that end, and certainly in the improvement of the vision.

Darier claims that in at least twenty-five per cent. of his cases he has obtained favorable results; and when we remember the uncertainty of results obtained by the use of other methods, we must certainly recognize the value of injections.

Abadie reports favorable results in all degrees of chorioretinitis. Pennon has reported thirty-one cases of choroiditis cured by means of sublimate injections.

Deutschman, Schmidt-Rimpler, Alt, Bull, Seggel have obtained favorable results.

In chronic choroidal lesions accompanying myopia, some observers claim good results even in these cases; although de Bourgon says that in such "success is but rarely obtained in practice if subconjunctival injections of sublimate are employed and nothing else."

Optic Nerve.—In old cases of optic neuritis where other remedies have proven unsuccessful, Darier says we may often obtain good results after subconjunctival injections. In infectious neuritis, good results have been obtained, but in optic atrophy no impression has been seen.

Suppuration following Traumatism.—Deutschman reported that sublimate injections have been used by him with great utility, especially in post-operative infection, and that in some of these cases eyes were saved which usually resulted in total loss.

Gepner has also resorted to sublimate injections with benefit in serious injuries to the eye. He gives as his reason for so doing:

1. Because we cannot foretell where we will have wound infection before we see our patient.

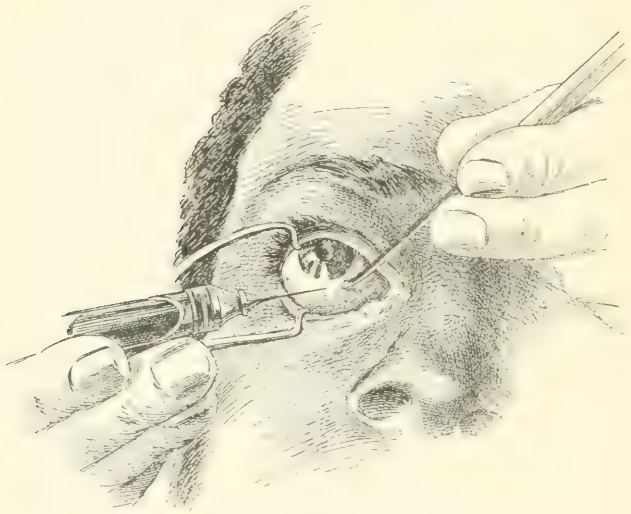
2. Because in every deep injury we cannot foretell whether sympathetic ophthalmia will result.

At a meeting of the Practitioners' Society in Stuttgart this year, the subject of subconjunctival injections was discussed. Neunhoffer reported some excellent results by the use of the sodium chloride injections. Neunhoffer is a convert to the latter solution.

Distler at the same meeting reported that in his practice he uses

both solutions, preferring in some cases sublimate and in others the sodium chloride.

At the meeting of the French Ophthalmological Society this year, Fagé, of Amiens, reported his experience with antiseptic injections and irrigations of the anterior chamber in certain suppurative conditions. Fagé claimed that the injections into the anterior chamber had never been followed by any unpleasant results, and the pain was less than when the subconjunctival injections were used.



Technique of subconjunctival injections.

This method was resorted to in eleven cases of corneal abscess, of which six were accompanied by hypopyon and severe iritis. The results were excellent.

In the discussion which followed, Abadie expressed himself as favoring sublimate conjunctival injections in superficial infected processes, while in deeper lesions he would not hesitate to inject a 1–1000 sublimate solution into the anterior chamber.

De Wecker opposed the irrigation of the anterior chamber, since the weakest solution of mercury would produce an injurious effect upon the endothelial membrane of the cornea.

Darier spoke in favor of combining injections of cyanide of mercury with irrigation of the anterior chamber when there are deep septic lesions behind the iris.

The therapeutic value of these injections was admitted by all the ophthalmologists present. A great many use a solution of cyanide of mercury, claiming to have even better results, with the advantage of not producing so much pain at the point of injection.

As for myself, I have always used a bichloride solution, 1–1000, and have been universally satisfied with the results obtained. The technique is as follows:

The eye is first *thoroughly* cleaned and then *thoroughly* cocainized. If this latter precaution is taken, the pain of an injection is always very slight. The lids are held open by a speculum or an assistant, and the patient told to look up, which, as a rule, they involuntarily do. With a small pair of forceps the conjunctiva about six millimetres from the cornea is raised up, and with a sharp, fine, sterilized needle, attached to an ordinary hypodermic syringe, the mercury solution is injected until a bleb is produced the size of the end of the little finger. The eye is immediately closed and bandaged for twenty-four hours. In two days the injection is repeated again, but not continued unless there are signs of improvement after the fourth. Usually the improvement is marked after the first injection. In conjunction, I always use atropine and hot fomentations when these are indicated. The accompanying illustration gives a good idea of the technique. From personal observation and experience, covering a period of three years, during which time I have constantly used the sublimate injections, I would derive the following conclusions:

1. In infected processes of the cornea, ulcers, abscesses, wounds, etc., this method of treatment is quicker, and therefore more satisfactory, than the treatment usually employed.

2. In acute iritis it does not seem to exert any beneficial influence, but in chronic cases the results have been more satisfactory, especially in breaking up adhesions.

3. In post-operative infections and panophthalmitis, it is by far the best method to which we may resort with any hope of ultimate success.

4. In pannus of the cornea no results could be obtained.

5. In deeper-seated lesions, as choroiditis, the results have been very variable.

6. In conclusion, I think this method should be used in conjunction with well-tried remedies.

REST: A RATIONAL THERAPEUTIC AGENT IN THE TREATMENT OF DILATATION AND DISLOCATION OF THE STOMACH.[1]

BY C. D. SPIVAK, M.D.,

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At the Denver meeting of the American Medical Association, I had the honor of reading a paper before the Section of Medicine on the subject of rest in the treatment of gastro-intestinal disorders.[2]

During the past year I have continued the study of the subject, and not only have my conclusions been confirmed by further clinical experience, but I have extended the therapeutic indications of rest, which new conclusions, based upon both theoretical and practical grounds, I wish to present before you for consideration. As this paper is to a certain extent a continuation of my paper just referred to, I must beg your indulgence for quoting a few passages, which I hope will make clear the starting-point and the train of reasoning which I have followed.

"I will use the word 'rest' in its most comprehensive sense,—the antithesis of action. Life is action, but action is made possible by the period of rest during which the spent energies are renovated. All our organs manifest periods of action and repose alternately; some are absolutely rhythmic, as the circulation of the blood; others are only intermittent, as the secretions and excretions. Rest, therefore, can be defined primarily as nature's *prophylactic*. In the ordinary life of a healthy individual the period of activity and prophylactic rest are balanced unnoticed and unobserved. We are unable to measure the time of activity and rest. But as soon as man devi-

[1] Presented to the Section of Materia Medica, Pharmacy, and Therapeutics at the Fiftieth Annual Meeting of the American Medical Association, held at Columbus, Ohio, June 6–9, 1899.

[2] Rest: A Neglected Factor in the Treatment of Gastro-Intestinal Disorders. Journal American Medical Association, July 30, 1898.

ates from the normal it then becomes evident that the two must remain in a direct ratio in order to establish the equilibrium. The greater the activity that produced certain abnormal phenomena the longer must be the rest. The length of time which is required by nature for the repair of an injury must be in proportion to the severity of the injury, and the more severe the injury the longer time is required for the perfect recovery of the disturbed functions. Rest in such cases becomes a *therapeutic* agent."

As regards the application of therapeutic rest to diseases of the gastro-intestinal tract, I reasoned thus: "I take the stomach and intestine to be in no way different from any other organ in our bodies; they are made up of the same tissues, are subject to the same insults, and their mode of repair is identical with that in any other part of the body. I do not see the difference between the symptom-complex called neurasthenia and that symptom-complex called nervous dyspepsia. Why apply the Weir Mitchell treatment in the one and not in the other? I do not understand by what manner of reasoning one arrives at the conclusion that in the treatment of a painful limb, according to the maxim of Hilton, 'the maximum of result is coequal with minimum of disturbances,' but a painful stomach or painful intestine should not be accorded the same privileges. And, lastly, it is incomprehensible to fathom the wisdom of prescribing rest for the weary limb, an exhausted organ, anywhere in the body except in the stomach. The surgeon does not draw a line of demarcation between an ulcerated, broken, bruised, or simply inflamed limb. Rest is the *sine qua non* treatment. Go over in your mind the whole gamut of diseases of the stomach from a simple inflammation of the mucous membrane to solution of continuity, and you will find that the process, both pathologic and reparative, is the same. Why, then, not apply among other things the same remedy?"

My theoretic reasonings were verified by experience, and I have formulated the following indications:

"1. Rest is indicated in all dyspepsias, the underlying cause of which is a deranged nervous system.

"2. It is indicated in all cases where abdominal pain is present.

"3. In all cases of acute and chronic diarrhœa.

"4. In hemorrhage from the stomach or intestines.

"5. In all cases of movable or floating kidney.

"6. In all tubercular cases suffering from disturbed digestion, be it stomach or intestine, and especially those that have a vacillating temperature record; and as there are but few cases of tuberculosis that do not suffer from some form of gastro-intestinal disorders, the rest cure is indicated in fifty per cent. of all cases of tuberculosis. Not only are they relieved from their annoying digestive symptoms, but their general condition markedly improves."

Notwithstanding the fact that at the last meeting I said, "I wish to proclaim loudly and boldly that I employ rest, nature's panacea, as my first and best weapon against the greatest foe of mankind,—diseases of the gastro-intestinal tract,"—yet I must confess my loudness was forced and my boldness was assumed. For in the depth of my heart I feared the consensus of opinion of my elders in proclaiming me an irredeemable crank. Imagine, then, my surprise and delight when I was forced to conclude, from personal letters received from many eminent clinicians and gastro-enterologists, that the subject of rest as a method of treatment in gastro-enterological cases is, to say the least, in a mooted state.[1] Permit me by way of illustration to quote a few excerpts from the letters:

Dr. S. Weir Mitchell: "As to your resort to rest in these cases, it is often the determining agent in a cure. This we have been insisting upon for years. Rest that you may exercise, exercise that you may rest."

Dr. J. M. Da Costa: "Your essay on rest is very interesting, and makes a strong case for the treatment you advocate. Its true value can only be ascertained by a continuous clinical observation. Certainly, where there is abdominal pain and hemorrhage, there can be no question of its value; but I fear that, with the inborn restlessness of the American patient, it would be difficult to carry it out in cases of chronic diarrhœa, movable kidney, etc., which you also indicate as suitable for the rest treatment."

Dr. William Osler: "I cannot agree with you that rest is in any way a neglected factor in the treatment of gastro-intestinal disorders.

[1] Dr. John C. Hemmeter, the erudite gastro-enterologist, has called my attention to a book recently published on the subject of rest by Dr. A. P. Gros, entitled "Traitement de certaines Maladies de l'Estomac par la Cure de Repos absolu et prolongé de l'Estomac (avec Alimentation rectale exclusiva)." Paris, 1898. Unfortunately, I have been unable to obtain the book. I am also grateful to Dr. Hemmeter for calling my attention to a mode of rest by temporary complete starvation advocated by Dr. E. H. Dewey, of Meadville, Pa., in his book, "Science of Living."

I suppose in every case of nervous dyspepsia that has been admitted to my private ward for the past three or four years the element of rest in bed has been regarded as a most important factor. In cases of chronic diarrhœa particularly the ordinary measures of treatment are rarely successful without the addition of rest. I am glad to see that you also recommend the abdominal bandage. Sometimes this is quite as good as to put a patient to bed."

Dr. Max Einhorn: "Rest is certainly a very potent remedy, especially in acute ailments. No physician will do without it; but in chronic affections, while it may be advantageously tried, it is not always effective."

Dr. George Dock: "I read the article some time ago with great interest. I have to treat a good many cases like yours, and have long been carrying out the rest idea; and in fact agree with you in almost everything except the continued poultice, which I have not been so pleased with as you seem to be."

Dr. S. Solis-Cohen: "I think your article on rest judicious, but that you are overstating the case in saying that it has hitherto been neglected."

Dr. Henry L. Elsner: "I am of the opinion that it is necessary to use the rest cure in many cases of stomach diseases, but agree very fully with you that each case must be individualized. My experience with the treatment of gastroptosis, gastro-ectasia, and what Leube describes under the head of 'nervous dyspepsia,' is not much in favor of absolute rest. Many of these cases are already morbid, neurasthenic, and are ofttimes made worse by rest. I wish once more to congratulate you upon your success, for I believe you have called our attention to a matter which is ofttimes forgotten."

Dr. H. Illoway: "As to the importance of rest in bed in the treatment of intestinal troubles there can be absolutely no question. With me it has been self-understood and long practised. In my opinion, the man who neglects rest in bed in the treatment of bowel affections neglects the most important factor for good, and subjects his patients to great dangers."

Dr. Fenton B. Turck writes: "My experience with rest cure according to Weir Mitchell's treatment forces me to conclude that it is not of any lasting benefit in cases of marked gastro-enteric neurasthenia."

Dr. Allen A. Jones: "I am in hearty accord with your conten-

tion for rest in the treatment of many gastric disorders, and congratulate you upon the good work you are doing."

Dr. Charles D. Aaron, Detroit, writes: "I fully agree with you in reference to rest in gastro-intestinal diseases."

Dr. J. H. Musser: "I do not think any observing practitioner can fail to agree with you in the propositions you have set forth. I am sure we get the best results in our cases at the Presbyterian Hospital from rest, even in cases of chronic gastroptosis. I did not, however, happen to see such excellent results as you report, but shall profit very much by the many suggestions you have made. I shall all the more eagerly and earnestly urge it upon my patients. . . . The matter of poultices is new to me, and I will later use them in the management of my cases."

Dr. Henry W. Bettman, Cincinnati, writes: "The article on rest is certainly correct in its essential features. It is possible that the necessity of beginning systematic treatment by rest has been slightly exaggerated, but the course you advise is of immense value in a large variety of cases."

Dr. Charles G. Stockton: "I agree with you as to the importance of the rest treatment in enteroptosis when it can be associated with real intelligent medical gymnastics. There is no doubt, also, that the rest cure is of value in hyperchlorhydria and in other irritative forms of gastric disease. The rest cure, in the broad acceptance of that term, is in my judgment the most important therapeutic measure."

A review of the above opinions expressed by such eminent men will convince us that the subject of rest is by no means a settled question. Since writing my first paper, I have extended the therapeutic indications of rest to cases of dilatation and dislocation of the stomach. The results were surprisingly favorable. In making the "brief" of my "case," to use a legal term, I reasoned thus:

All the viscera contained within the abdominal cavity are subject to a certain amount of gravity-pressure. In man, his posture is such that the gravity-pressure of the stomach—the uppermost organ—is only one-third of that of the bladder and one-fourth of that of the rectum.[1] The stomach is held in position, suspended from above, by two ligaments,—the duodeno-hepatic and gastro-splenic liga-

[1] C. Schwerdt, Enteroptose und intra-abdominaler, Druck. Deutsche medicinische Wochenschrift, 1896.

ments; the œsophagus giving little or no support, and the gastro-hepatic ligament, on account of its frail structure, can be left out of consideration. The stomach is supported from below by the upward pressure of the transverse colon and intestines. The abdominal muscles also contribute to the support of the stomach. From the above considerations it is easy to see that the stomach is but poorly provided with "stays." Abnormal weight exerted upon the stomach will press the organ downward (enlarged liver, emphysema, corset); abnormal weight exerted within the stomach may either shove it downward or increase its capacity, or produce both conditions (too frequent or too large meals, accumulation of gas). When the normal support of the abdominal muscles is taken away (corset, pregnancy, pendulous abdomen), the stomach will tend to occupy the vacuum thus created. When the equilibrium of the intra-abdominal pressure is disturbed by the rapid disappearance of fat within the abdomen (exhausting diseases) the stomach will follow the law of gravitation. An overloaded colon will encroach upon the viscera below and drag the stomach along with it. These are the main etiological factors of downward displacement and non-obstructive dilatation of the stomach.

Given one of the above two conditions, there is one factor that aggravates the condition, no matter what the particular etiologic factor might be,—namely, posture. Gravity-pressure from above downward in the abdominal viscera is present only when one assumes the erect posture. When in the horizontal posture, gravity-pressure is *nil*. It is also self-evident that food in the stomach will act as an additional weight, and, when in the erect posture, will add to the gravity-pressure. The logical corollary, therefore, is: No matter what the condition is, displacement or dilatation, whether produced by one or the other of the many and varied etiological factors, whether you prescribe tonics, massage, electricity, restricted diet, passive or active exercise, the first indication is to diminish the gravity pressure, so as to relieve the abdominal viscera from continuously adding new insults to old injuries.

There is only one way by which this gravity-pressure can be diminished to the zero point, and that is to change the centre of gravity of all the intra-abdominal organs by the individual assuming the horizontal posture, or, in other words, by *rest in bed*.

I have carried out this therapeutic measure in several cases of

gastroptosis and gastro-ectasis, and have obtained encouraging results. Permit me to recite two typical cases.

Case I. *Dilatation of the Stomach.*—Referred to me by Dr. George F. Rochrig. M. P.; forty-six years old; butcher; served for three years in the Prussian army; has enjoyed good health until within ten years ago. Commenced with cough and disturbance of digestion, which continued for one year. He described the sensation in the stomach as that of dryness; had also pain in the abdomen, but no vomiting. For some time he had to be careful in the choice of food. He lost about thirty-five pounds in weight during that year, but has gradually regained health and weight. Five years ago after eating watermelon was seized with cramps, which lasted for about three weeks, and gradually recovered. After that he suffered for three months from a bad attack of sciatica (left), from which he also recovered, and regained his usual body-weight of one hundred and eighty-five pounds. Two years ago, April, 1896, he suddenly had an attack of diarrhœa, fainted twice, then vomited. Had to stay in bed the following day. He thinks the attack was due to spinach which he ate that day. In July of the same year, after eating cheese, had another attack of diarrhœa, which was accompanied by similar symptoms as in the first attack,—namely, fainting and vomiting. Recovery from the second attack was somewhat slower. In January, 1897, after having had a heavy dinner at noon, became suddenly sick at four P.M. He had such severe cramps in the abdomen that the attending physician suspected gall-stones. This attack, the main characteristics of which were pain and vomiting, lasted nine days and gradually disappeared.

His present condition dates from June, 1897. Pain in abdomen constant, never free from pain for more than an hour at a time. The vomiting comes at irregular times: it is usually preceded by the sensation that the food had "soured on his stomach." During the cramps, his stomach swells up and moves about from place to place. Besides the pain there is also present the feeling of constant pressure at the pit of the stomach. He had several fainting spells, especially when he tried to do some work. This time he had no diarrhœa. He suffered from constipation. His appetite remained good throughout the disease, at times it was ravenous. He lost eighty-five pounds. He came under my observation August 13, 1898. The character of the vomitus and the stomach contents; the fact that the lower

border of the stomach almost touched the pubes when the stomach was inflated with air or carbonic-acid gas; the peristaltic movements of the stomach which manifested themselves during a paroxysm of pain, and could also be induced by a sharp, sudden stroke, and by which the shape and position of the stomach could be mapped out; the splendid appetite, made the diagnosis of a dilated stomach a matter of certainty. After a thorough lavage he was ordered to go to bed and *stay* there. Hot poultices were applied day and night; no food given during the first twenty-four hours. During the next day one teaspoonful of milk every hour, the third day two teaspoonfuls, the fourth day a tablespoonful of milk every hour. *After the first day he had no more pain or vomiting.* I have used no other drug except strychnine, one-twentieth of a grain, as a tonic, and occasionally small doses of cascara sagrada to regulate the bowels. When he was able to drink a glassful of milk at a time without giving rise to any annoying symptoms, fearing that large quantities of fluid may distend his stomach and thus frustrate the ends of the treatment, I have cautiously and gradually introduced meat into his diet, then bread, butter, and scraped apple, soft-boiled eggs, and, lastly, rice with cream, all of which he greatly enjoyed. He rapidly gained in strength and probably in weight. We had no facilities of having our patient weighed until the 19th of September, 1898, when he weighed ninety-six and a half pounds. He gained five pounds during the first week, three and a half during the second, two and a half during the third. The recovery was continuous, without a single relapse.

At the time of this writing, June, 1899, my patient weighs one hundred and fifty-five pounds; the lower border of the stomach is about two finger-breadths below the umbilicus, and he pursues his old vocation.

Case II. *Dislocation of the Stomach.*—Kindly referred to me for treatment by Dr. Henry Sewall. J. J. C.; forty years old. She has had stomach trouble for two years. It commenced with nausea which began at nine A.M, and abruptly ceased at four P.M. This condition lasted for several months. For the last two months the nausea has returned, which now lasts longer, and ceases late in the evening. At one o'clock in the morning she invariably wakes up with a severe headache and pain in her stomach, which continues until four or five A.M., when both the headache and stomach-ache

cease almost abruptly. She is constipated most of the time. She used the stomach-tube for the last six months almost daily. The physical examination fully corroborated the diagnosis made by Dr. Sewall, April 18, 1899. The upper and lower borders of the stomach could be mapped out through the abdominal walls, the first being about two finger-breadths above the umbilicus. She weighed one hundred and twenty-six pounds. My treatment was principally rest in bed. Her bowels were regulated, her diet was restricted at first, and poultices were applied constantly during the first two weeks, and for an hour after each meal afterwards.

All the annoying symptoms left her during the first week. She had mild and short relapses of the headaches, and has twice suffered from abdominal pain after indiscretion in diet. When she left Denver (July 7, 1899) she weighed one hundred and twenty-seven pounds (gained eleven pounds), was free from nausea, abdominal pain, and headache. She returned full of good cheer to her husband and seven children. At the last examination I could not map out the upper border of the stomach, the lower border having ascended about two inches above its former position.

I wish, in conclusion, to state that in neither of the above cases have I used the stomach-tube for therapeutic purposes.

THE USE OF SUPRARENAL CAPSULE EXTRACT IN SURGERY OF THE EAR, NOSE, AND THROAT.[1]

BY W. W. BULETTE, M.D.,

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ALTHOUGH it has been but a few months since extract of suprarenal capsule was introduced to the medical profession, yet I suppose that even in this brief time most men working in the specialty of the ear, nose, and throat have had more or less clinical experience with the use of the preparation; it is with the hope of inviting discussion and to elicit the experience of his fellow-workers that the writer has ventured to offer the subject of this short paper to the Association.

The literature on the physiologic and therapeutic action of extract of suprarenal capsule is very meagre at present, save the valuable contributions by Bates, Howe, Mullen, Abel, and Barrand, together with clinical notes by Vansant and Lederman; other essays may have been published, but, if so, they have not come to my notice.

I began the use of extract of suprarenal capsule in my practice about two years ago, within which time I have employed it in one hundred and thirty-seven intranasal operations, forty-six operations on the throat, and eighteen on the ear, the sum total of which are from my records; it is unnecessary to burden you with the detail of the histories or diagnoses of these cases, as they were such as present themselves to the aurist and laryngologist everywhere.

I have used all the local anæsthetics commonly employed in surgery of the ear, nose, and throat, including cocaine, eucaine, holocaine, and guaiacol, and of these I prefer cocaine. After placing the ear, nose, or throat in as aseptic condition as possible, I apply a four- to ten-per-cent. solution of cocaine to the parts on a cotton

[1] Read before the Rocky Mountain Interstate Medical Association, Salt Lake City, Utah, July 25 and 26, 1899.

pledget and leave in place for ten minutes, in operations on the nose or ear; or, if hurried, rub the anæsthetic into the tissues with a stout cotton carrier, first warming the cocained cotton over the lamp-flame as by this means local anæsthesia is complete in three to five minutes, and lasts longer than where a cold cocaine solution is used. In operations on the throat I generally use a spray of two- to four-per-cent. solution of cocaine.

As the solution of adrenal extract decomposes quickly, it should always be freshly prepared with boiling, distilled water, or hot saturated solution of boric acid, adding five to ten grains of the extract to the drachm, stirred for five minutes and filtered; it can then be applied to the tissues by spray or a saturated cotton pledget. In five to ten minutes the tissues become decidedly anæmic, or almost white as though bleached; it contracts the small blood-vessels and binds down the mucous and submucous tissues to the periosteum, and increases the physiologic action of the cocaine; and as the blood does not flow freely after incision and does not carry away the cocaine with the blood-stream, the anæsthesia is much prolonged, so that minor operations can be done painlessly and with but a trifling loss of blood,—a great consideration to both patient and surgeon, and greatly assists the latter in the expeditiousness and thoroughness of his work.

It has also been my experience that there is but little secondary hemorrhage after the use of the adrenal extract, not so much post-operative swelling, and that the healing process is much more rapid than where cocaine alone is used. The extract is also serviceable in all methods of cauterization, reducing the swelling and reaction to a minimum, and promotes rapid healing of the parts.

Mullen states[1] "that he prefers to introduce the extract directly into the tissues by the galvanic current, and that experience has demonstrated this to insure a more prolonged and thorough effect of the drug."

I have used cataphoresis in applying both solutions of cocaine and the extract to the tissues to induce local anæsthesia in several operations, also in applying the cocaine alone, and using the extract on cotton pledget in contact with the tissues; again in others I have applied the cocaine in the ordinary way, and the extract by the electric current, but in every one of these operations the pain while

[1] International Clinics, 1898, Vol. IV., Seventh Series.

operating was severe, and the secondary hemorrhage very considerable, so that I am of the opinion, from my own experience, that local anæsthesia cannot be induced with cocaine and adrenal extract by the aid of cataphoresis as thoroughly as by other methods of applying these preparations, and, further, that cataphoresis induces hemorrhage, particularly secondary bleeding. Possibly my technic may have been faulty, or the particular patients in question on whom I used cataphoresis may have been bleeders; yet it is hardly possible that all of these cases had this idiosyncrasy.

I have not seen any unpleasant systemic effects from the use of the extract, but, on the contrary, I have observed fewer cases of cocaine toxæmia than formerly; in fact, I recall but two of the two hundred and one cases operated in which there was alarming symptoms of cocaine poisoning, and these were both delicate, nervous women.

Finally, I wish to add that I consider desiccated extract of suprarenal capsule one of the most valuable products that has been offered the profession in recent years, and that with its aid minor surgical operations become a pleasure, and, further, that the dread of pain and hemorrhage by the patient can be reduced to a minimum.

The preparation of adrenal made by Parke, Davis & Co. I have found more soluble than some others, and is also cheaper. I have seen no difference in its local effect over that of other houses.

DISCUSSION.

Dr. Melville Black, Denver.—I do not believe there can be found a stronger supporter of the extract of suprarenal capsule than myself. I know of no drug that has given me the same satisfaction. I have used it purely for its action upon the blood-vessels, and not with any idea of its being a remedy which will effect a cure. For the prevention of operative hemorrhage it has no equal. Used for the first time its action seems marvellous. Take a tissue that is red and congested, the blood almost coming through the vessel walls; use the extract for a few moments, and scarcely the line of a blood-vessel can be seen. For intranasal operations it is absolutely invaluable. It renders the site of the operation free from hemorrhage, and it can be kept so by reapplying the drug as soon as the blood again becomes annoying. Reapplication does not seem to cause the tissues to become insensible to its action, for each application seems to be

as active as the one that preceded it. We all know that, in using cocaine alone, after the first effect is lost reapplication of the drug has but little or no action. By the use of suprarenal extract cocaine can be applied again and again, each time with full effect. I have found it of great value in polyp operations where the hemorrhage obscures the parts, rendering it difficult to see if all have been removed; to make sure of this point, we have been in the habit of seeing patients every day. Now, by the use of the suprarenal, we can go on and complete the operation at one sitting, and can operate as long as we please, with but little inconvenience to the patient. In the removal of spurs from the nasal septum and in the minor straightenings of the septum the suprarenal makes the operation comparatively simple; the cocaine has so much more effect that the patient complains but little of pain. In major septal operations, where the patient is under a general anæsthetic, the suprarenal will be found to so lessen hemorrhage that some of the disagreeable features of the operation will be overcome. After the removal of a septal spur, the suprarenal is applied to the part until all oozing of blood has ceased and the part is perfectly clean. I then apply a fifty-per-cent. solution of trichloracetic acid to the cut surface, which seals it and prevents the recurrence of hemorrhage. The patient will go home, sleep quietly all night, and return the next day with the nose open and free from blood-clots. In ear work, I have found suprarenal of the most value in reducing a swollen Eustachian tube. It is best applied through a Eustachian catheter. The reduction of the stenosis thereby allowing the middle ear to be ventilated will frequently abort an attack of acute inflammation of the middle ear.

HYDROTHERAPY IN THE HOMES OF THE POOR.

BY ALFRED C. HAVEN, M.D.,

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THE "Elixir Vitæ" that will renew youth, or some rare drug that will banish disease, is as earnestly sought after to-day as one hundred years ago, and we bid all such investigators God-speed. Yet we cannot but feel that in this desire for the rare and mysterious one may overlook the common, omnipresent remedies, many of which have untold properties for good, if only correctly used.

The German laboratories are daily pouring out new drugs with names a yard or more long, which promise marvellous results for good or evil, and which tax the energies of the physician to even keep a "calling acquaintance" with.

We are told that fifty years ago a fever patient was denied a glass of cold water, a prohibition we now know to have been a ruinous procedure. Think of the torture that was then orthodox treatment! We shudder to think of it, and yet it seems to me many physicians to-day use less sense in the management of fevers than their predecessors of fifty years ago. They truly withheld water to flush out the poisons. The modern physician too often *adds another poison* for the system to care for, when crippled by ptomaines and toxic products generated by the fever. The whole list of coal-tar derivatives, phenacetine, acetanilid, etc., lower fever, it is true, but at what expense? Retarding elimination, depressing heart action, and taxing the system with another posion, when it is already burdened to a dangerous degree. Which is the more rational, the treatment of fifty years ago that withheld water, or the treatment of to-day, that adds a poison that deludes the patient, and too often the physician himself? Nor in my judgment do the sins of the modern physician in the management of fevers end here. They allow water *internally*, but they withhold water externally. I am positive that the

latter is equally as necessary to the well-being of the patient as the former. I do not mean that water in the form of sponging and bathing is entirely prohibited; but I do mean that, outside of the hospitals in our land, and with the exception of a few metropolitan physicians, water *externally* is very unscientifically administered; and, believing, as I do, that water is one of God's greatest blessings both in health and disease, I cannot but feel that the modern physician is well-nigh as culpable as his predecessor of fifty years ago, whom every one, physician and laity, is so anxious to speak of in terms of condemnation. And is it not strange that this remedy, so abundant, so essential to life, so marvellous in its effects, should be neglected for other less easily obtained medicaments? *Prejudice* accounts for some of this neglect, for one does not like to be called a hydropath or a homœopath, or any other bad name. Still, true it is that quacks did for years hold almost undisputed sway in the use of this delicious remedy. It is not due entirely to *ignorance*, for Brand, Baruch, and others have demonstrated its power, and every hospital of any account recognizes and makes use of this knowledge.

Yet ignorance is responsible in a large measure after all,—ignorance of the true physiological action of the cold bath. Water is useful for purposes of cleanliness, and water reduces fever. Does its efficacy in fever end here? Not at all. The cold bath in fevers is far more potent in helping the patient back to health. Briefly, the cold bath stimulates the heart, strengthening this organ. It quickens the respirations, causing deep inhalations of oxygen and exhalations of CO_2. It causes the kidneys to do more work, too, throwing off the poisons by this channel; the skin is kept healthy, all the emunctories of the body become active, and the poisonous products are thrown off. Nor, indeed, is this all, for the nervous system, that dominant system presiding over every function of the body, is whipped into action by the beneficent shock of the cold bath; the dormant functions are aroused, new vigor is given to every poisoned, torpid organ, new life is infused into the individual, the mind becomes clearer, and the whole machinery of these wonderful bodies of ours, made after the image of the Creator, is charged with new power, and the struggle against the disease is renewed with greater energy. In fine, the poisons are eliminated and the whole nervous system strengthened, and the patient is placed in a far more favorable condition to combat the disease.

I have talked with a great many physicians concerning the use of water, and the almost universal reply given is that water is probably all right in hospitals, but that a busy physician in private practice cannot use it, for it requires too much time and too much work; and consequently this wonderful old remedy is discarded for some drug which can be scribbled for in mystic figures, and which often puzzles the druggist to decipher. I believe this view erroneous, too. Granted that the Brand treatment is the best in fevers, and this admits of no doubt when every hospital in the land adopts it and the foremost physicians in all the civilized world acknowledge it. How then can it be adopted by the busy practitioner? Easily in the homes of the rich, who have bathing facilities and trained nurses to administer baths under the physician's directions. How can this treatment be made possible in the country farm-house and the city tenement where no tub is at hand and help is limited? I admit the proposition is more serious, but I believe not insurmountable. It will necessitate some time at the first visit to overcome the almost universal prejudice against the cold bath, but the results will vindicate the physician. All physicians know that many people never bathe except their hands and faces, and they would expect to catch their death by cold if immersed in a cold bath. This prejudice is often difficult to overcome. Promise to administer the first bath and stand by the consequences. You will soon win them over by the good results. I well remember laboring an hour at three o'clock in the morning with the friends of a patient of mine who was delirious, with high temperature, 105° F., suffering with typhoid pneumonia. I administered the bath; in one hour the patient was asleep, and a little later his temperature was 100°. I had no more difficulty with the friends or the patient either, for that matter, who made an excellent recovery.

Have slips printed giving very exact directions, and make them brief. These may be left after giving one bath personally. These should explain the temperature of the bath, the quantity of water to be used, the temperature of the patient requiring a bath, how long to administer one, and emphasize in large letters the necessity of using *friction* during the entire period of the bath, and many minor details of the bath may be suggested. A personal demonstration is worth tons of printed matter, however.

Many physicians are afraid of giving cold baths for fear of in-

juring the patient; the contraindications to the use of the bath are not many. Old age and early infancy generally contraindicate the use of the cold bath. When rest is imperative, as in peritonitis, pleurisy, or in perforation or hemorrhage in typhoid fever, omit them. Never give a cold bath without *friction*, and this is well given by means of a piece of coarse crash towel. Friction avoids internal congestions and insures reaction. If the patient is of a nervous temperament, he may be put into a bath of 90° F., and cooled down to 70° afterwards; but often the slight shock is desirable, obtained by placing him in the cold bath at once.

Many have been the attempts to modify the Brand treatment, but, after all, his exact directions are the best to follow; fifteen minutes are usually long enough, and these baths should be repeated once in three or four hours if the temperature rises above 101° or 101½° F. in typhoid.

Typhoid fever is the best example of the beneficent use of the cold bath. The results are truly marvellous. I have treated over forty cases in two years,—some severe, some mild, but all recovered. In my judgment, it is the only treatment for this disease until some true specific is discovered.

The use of the cold bath is not confined to typhoid, but should be used in any case of hyperpyrexia, as in sunstroke, in the exanthemata, and even in some cases of pneumonia.

One more element is absolutely necessary before the masses can hope to receive the benefit of this unparalleled treatment, and this I have purposely left to the conclusion of this paper,—viz., the form of *bath*. Water may be abundant, helpers may be at hand, but few tenement houses or farm-houses possess the necessary *bath-tub*. The simplest expedient that I know of in such cases is to buy three yards of common table oil-cloth (rubber cloth is more durable but more expensive); then tie a loop of clothes-line around the head-board of the bed, and another loop around the foot-board, and connect these by two parallel ropes, thus forming a framework for the bath. Roll the patient on the sheet, attach the edges of your rubber sheet to the rope with a dozen clothes-pins, and a very efficient bath-tub may be improvised at an expense of about seventy-five cents. The oil-cloth will hardly last long enough to treat more than a single case, as it soon wears through, and then leaks.

I have examined all the portable baths in the market, and have

used some of them at times, but they are all cumbersome, expensive, and rather complicated. I have endeavored to make a bath of great simplicity, as inexpensive as possible, and small, and therefore portable.

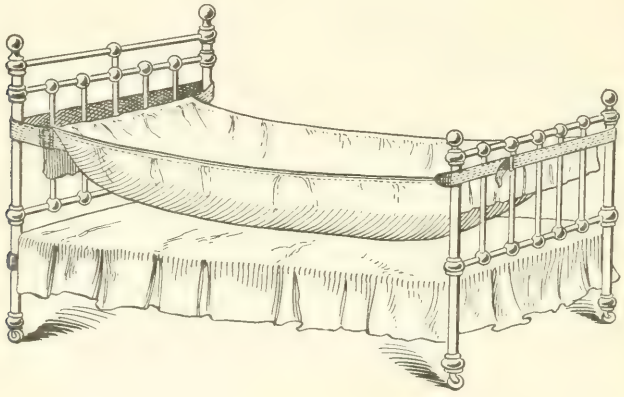
My bath consists of two canvas straps about three inches wide, and long enough to easily encircle the head- or foot-board of the largest-sized bed. A simple clamp fastens the ends automatically, and enables the canvas band to be drawn very taut, thus holding it at any height desirable on the head- or foot-board. Each of these canvas bands has two rings sewed to it, twenty-six inches apart; then a rubber sheet hemmed on the sides, two ropes slipped in the hems, and four snaps on the ropes' ends. The two canvas straps and the rubber sheet comprise the essential parts of the whole bath.

To use the bath, the patient is rolled on the sheet and the four snaps are caught in the four rings. The canvas bands may be left on the head- and foot-board during the entire period in which the baths are to be given. This simple bath when not in use folds up and is carried in a small canvas bag about the size of a small hand-satchel. This portability is not possessed by any other bath. The physician or nurse may thus carry the bath with him to the homes where bathing facilities are absent, and, after giving one bath and leaving printed instructions, the attendant can continue them.

In emptying the bath one snap is released, a valley in the sheet formed, and most of the water may thus be conducted to a tub or pail on the floor. To empty it entirely, a small piece of garden-hose may be used as a siphon,—and this is used by any one not understanding the principle of the siphon,—if a plug of wood is fitted in the end of the hose before it is filled with water, otherwise the use of the siphon is often a failure. Of course, the siphon may be omitted and a large sponge or small dipper used, but these are slower.

In closing this paper, let me emphasize the fact that I do not regard the bath as a *cure-all*. It is simply one of the means, and a very powerful one, too, that should be in the hands of every physician in combating disease. The chief reason why it is not more generally used is the universal belief that it requires too much time and trouble. I have endeavored to minimize these by offering a bath that is simple, easily carried by the physician anywhere, cheap, —costing only five dollars, Sharp & Smith, of Chicago, manufacturing it for that price. This difficulty overcome, I do not see

why this remedy should not be more universally used, as no known drug will accomplish at times what this common, every-day simple



remedy, *cold water*, can do, and thus every physician who truly has the good of his patient at heart cannot afford to neglect this king of remedies.

Treatment.

THE TREATMENT OF PNEUMONIA BY HYPODERMOCLYSIS.

BY FREDERICK P. HENRY, M.D.,

Professor of the Principles and Practice of Medicine in the Women's Medical College of Pennsylvania; Physician to the Philadelphia Hospital.

In the spring of 1889, I treated, at the Philadelphia Hospital, several severe, apparently desperate, cases of lobar pneumonia by a method which, I am confident, has often turned the scale in favor of recovery. The method to which I refer is hypodermoclysis, and my experience of it is, I believe, amply sufficient to warrant me in recommending it strongly in the cases in question. The fluid injected beneath the skin was the "normal saline" solution (about fifty grains of chloride of sodium to the pint of water), and I was induced to employ it by the apparent deficiency of water in the system as indicated especially by a dry tongue, the absence of chlorides in the urine, and the universally recognized condition of hyperinosis. The object, in short, was to dilute the blood and prevent its ante-mortem coagulation. Whether these indications are present in pneumonia, and, if so, whether they are fulfilled by hypodermoclysis, are questions which I am willing to regard as open, although the therapeutic test, the argument *ex juvantibus*, is, I believe, strongly in favor of their affirmative answer.

As already intimated, the cases of pneumonia in which I have employed hypodermoclysis were of the severest type; a statement which is almost superfluous to those who are familiar with Blockley cases. The history of many cases of pneumonia admitted to the Philadelphia Hospital is about as follows: A tramp, after unusual exposure to cold and dampness, finds himself ill, and resorts to his

panacea for all ailments, mental and physical,—a drink. The remedy does him good, and in some mysterious manner he obtains more of it. By the time the stage of red hepatization is well advanced, he is stupefied with alcohol and exhausted by illness. He lies down upon a door-step, and when accosted by a policeman is unable to give any account of himself. Neither he nor the policeman has the slightest idea of the nature of the case. The man is arrested and locked up, with the object of sobering him; and, perhaps, the next day his cough may attract attention, and he is sent to the hospital. Or, while in jail, he may become delirious, and when taken to the hospital he is, as a matter of course, placed in the "drunk ward," where the pneumonia may or may not be speedily detected. All hospital physicians, and especially those connected with the Philadelphia Hospital, will acknowledge that this picture is not overdrawn. Such cases treated by ordinary methods terminate, as a rule, with few exceptions, in death. Such cases treated by hypodermoclysis terminate, as a rule, in recovery.

I first employed hypodermoclysis in two cases of the above-mentioned type. They were admitted to the hospital at the same time, and were men past middle age, habitual drinkers, and desperately ill. They both recovered. The recovery of these men made a great impression upon the resident physicians and nurses, and is still referred to by the intelligent superintendent of the medical floor, Mr. Owen.

These cases were treated almost ten years ago, and, owing to the loose manner in which the clinical records of the Philadelphia Hospital have been preserved, I am unable to say anything more concerning them than that they recovered. Thanks to Dr. Samuel M. Hamill, the interne on duty in my wards in March, 1889, I am able to give full details concerning a third case treated by hypodermoclysis.

The following notes are taken from Dr. Hamill's record of the case:

Sarah McC., aged sixty-three years, admitted March 14, 1889. Family history negative so far as her knowledge of it is concerned. Some years ago she was confined to bed on account of severe pain in the chest, and remembers having been wet-cupped. Her statement is confirmed by the presence of scars over the inferior angles of the scapulæ. Aside from this she has suffered no acute illness, but has

been subject to occasional epileptic attacks since childhood. She was admitted to the Out Ward Department of the hospital four years ago,[1] and has been there ever since. Her present illness apparently began on March 12, two days prior to admission, although, owing to the fact that her mental faculties are impaired, it may have begun earlier. On the 13th she complained of pain in the right side of the chest, was somewhat more stupid than usual, and was feverish; temperature, 102° F. She was detained in the out wards until the following day, when her temperature was found to be 104°. She was then transferred to the medical ward.

Condition on admission: Face flushed; skin perspiring freely; tongue slightly coated; pulse, 100; tension increased; volume full. Respirations, 30; temperature, 101° F. Physical examination revealed numerous sibilant and sonorous râles on both sides of chest, more marked on right. No increase in vocal resonance, no crepitation, and no material alteration in percussion-note were detected.

There are no notes of the 15th beyond the statement that the respirations ranged between 30 and 34 and the temperature reached 104° F.

16th.—Râles, as before, on both sides; but, in addition, over right chest behind, distinct crepitation and bronchial breathing, increased vocal fremitus and resonance and impaired percussion-note. These signs extended from the base to a point a little above the inferior angle of the scapula.

In addition to whiskey and aromatic spirit of ammonia, which had been prescribed on admission, a subcutaneous injection of salt and water (sixty-eight grains to the pint) was now administered. The amount injected was one pint. Temperature at time of injection, 103° F.; respirations, 38; pulse, 120, and of much diminished volume; perspiration profuse; tongue heavily coated; breath fetid, and stupor so marked that the patient was not aroused by the insertion of the needle. Dr. Hamill here remarks: I hesitated to order the injection, as the condition of the patient seemed hopeless. During this day the temperature of the patient ranged between 103.4° and 101.8° F., and at seven P.M. was 102.2°. During the night it fell to 99.4°, but rose again, and at eight A.M. was 101.1°. Respiration and pulse were more frequent, the former reaching 56 and the latter 132.

[1] The term "out ward department" is a euphemism for pauper department.

17th.—The hypodermoclysis was repeated. During the day the temperature ranged between 99.4° and 101° F., and at eight P.M. was 101°. Pulse considerably weaker during the day, but stronger towards evening, ranging between 111 and 130. Respirations between 36 and 46. During the night the temperature gradually fell, and at seven A.M. was 99.2°. Pulse and respiration both decreased in frequency, and the former was stronger at seven A.M.

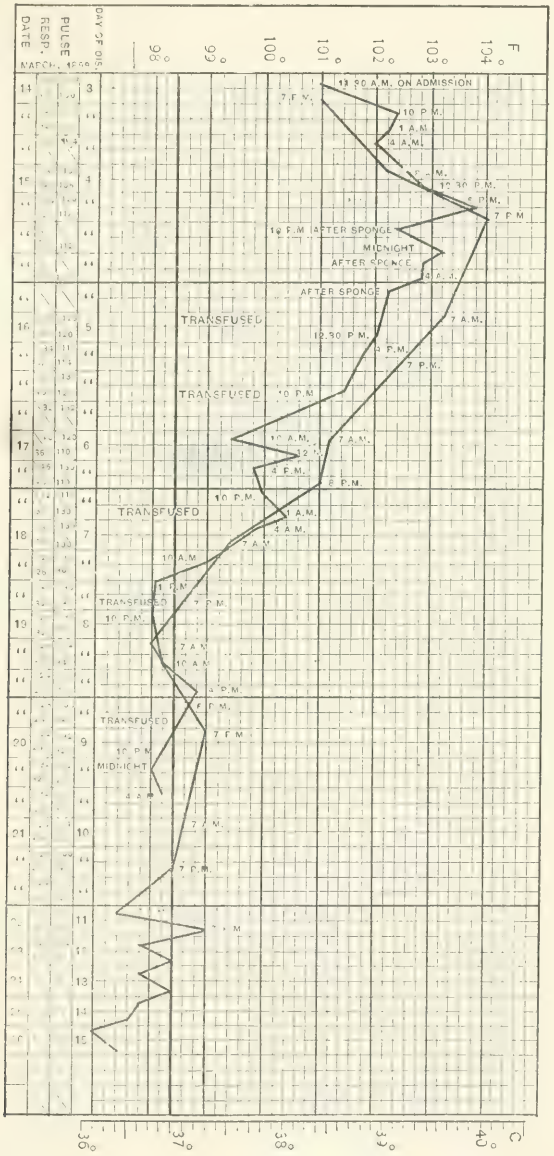
18th.—Physical examination showed coarser râles at the base, the other signs remaining as before. Patient more comfortable and less drowsy. During the day there was decided improvement, and at six P.M. the temperature was normal; pulse, 90; respirations, 28. Hypodermoclysis administered as before.

19th.—Passed a comfortable night, temperature not rising above 99° F.; pulse not exceeding 98, and the maximum number of respirations per minute being 32. Physical examination revealed further evidences of resolution. Hypodermoclysis repeated. Maximum temperature, 99°; respirations, 28; pulse, 98; patient very comfortable. From this date, as shown by the chart, convalescence was established.

20th.—The best hypodermoclysis was administered.

I have reported this case in detail for several reasons. First, because it was one of the severest type in a woman advanced in years and ill nourished; one in which, before the institution of the treatment, the prognosis seemed hopeless. Secondly, because in it the treatment was carried out most thoroughly, five subcutaneous injections of a pint each having been administered in the course of as many days. Lastly, and chiefly, because it is manifest that the course of the disease was remarkably modified by the treatment pursued. A glance at the accompanying chart shows it to be very different from the ordinary chart of a case of pneumonia terminating favorably. In short, in the case of Sarah McC. there was no crisis, and yet convalescence began on the seventh day. The fever subsided by the most typical kind of lysis. Now, when pneumonia, treated by ordinary methods, terminates by lysis, it does not do so on the seventh or ninth day. In fact, the course of a pneumonia which terminates by lysis is invariably protracted, because such a termination necessarily implies the existence of some complication. The significance of the mode of recovery in the case of Sarah McC. was not apparent to me ten years ago, when the chart was made; but since then I have

observed repeatedly that the defervescence in cases of pneumonia treated by hypodermoclysis is, as a rule, by lysis. It is impossible,

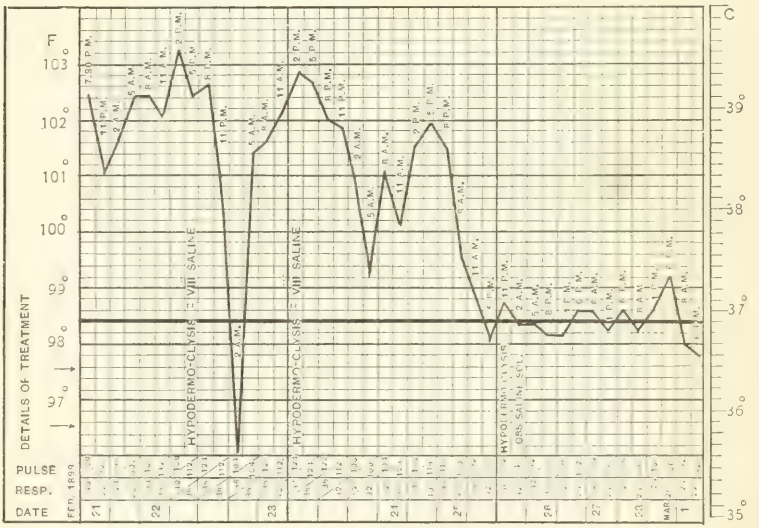


therefore, to deny that the course of pneumonia is modified by hypodermoclysis. In fact, it is modified in the most remarkable manner;

for, if there is a constant clinical feature in the course of any disease, it is the crisis of pneumonia.

Case IV. shows a remarkable pseudo-crisis shortly following the first hypodermoclysis, after which the temperature gradually became normal; in other words, the fever declined by lysis rather than by crisis.

Philip L., aged forty-three years, Italian, laborer, admitted February 21, 1899. Clinical history meagre. A few days before admission had a chill, accompanied by stabbing pain near the left nipple. There is cough with rusty sputum, and signs of extensive



involvement of the left lung both before and behind. On the evening of the 22d, at 7.30, eight ounces of normal salt solution were injected beneath the skin of the left mammary region. By two A.M. of the following morning the temperature had declined from 102.6° to 96° F. By five A.M. it was 101.4°; at two P.M., 102.8°. At seven P.M., the temperature being about 102.5°, another hypodermoclysis of eight ounces was administered. By five A.M. the temperature was 99.2°. It rose during the day to 102°, and the following day gradually reached the normal point, and there continued. On the 28th the patient was out of bed, and on March 9 was discharged cured. The favorable impression produced upon the course of the disease by hypodermoclysis seems manifest from a study of the chart.

CASE V.—Double pneumonia; typhoid-like chart, with defervescence by lysis; recovery.

William McC., aged thirty-six years, huckster, admitted April 15, 1899. He was taken ill on the 14th with chilly sensations, which lasted twenty-four hours, and were followed by pain in the chest, increased by coughing. Temperature on admission, 103.8° F.; pulse, 108; respirations, 30. This patient was at first regarded as a case of typhoid fever, and received two or three cold baths on the 15th and 16th. On the 17th, physical examination revealed consolidation of the greater portion of left lung, and on the following day there were positive signs of pneumonia at base of right lung. Hypodermoclysis, one pint, administered on 17th; a few hours after which the temperature fell from 102.2° to 99.3°. The following day it reached 104°, after which it gradually declined until the 21st, when it became normal and so continued.

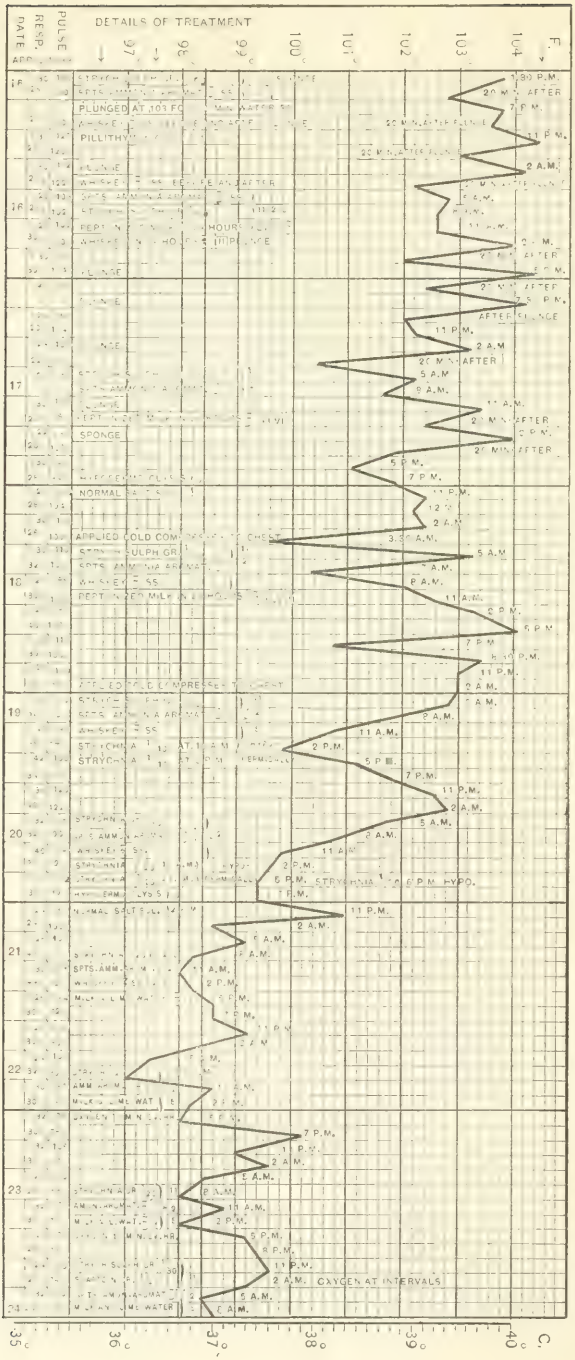
CASE VI.—Frank W., aged fifty-three years, admitted May 9, 1899, with history of a severe chill followed by pain in the chest four days ago. Middle lobe of right lung consolidated. Over base of left lung very harsh bronchovesicular respiration, almost bronchial in character. Temperature, 104° F.; pulse, 120; respirations, 58. At 6.30 P.M. of day of admission, hypodermoclysis, two pints, in left axillary region. The temperature just before the hypodermoclysis was 102°; pulse, 100, and respirations, 44. At twelve, midnight, the temperature was 99°; pulse, 92, and respirations, 36.

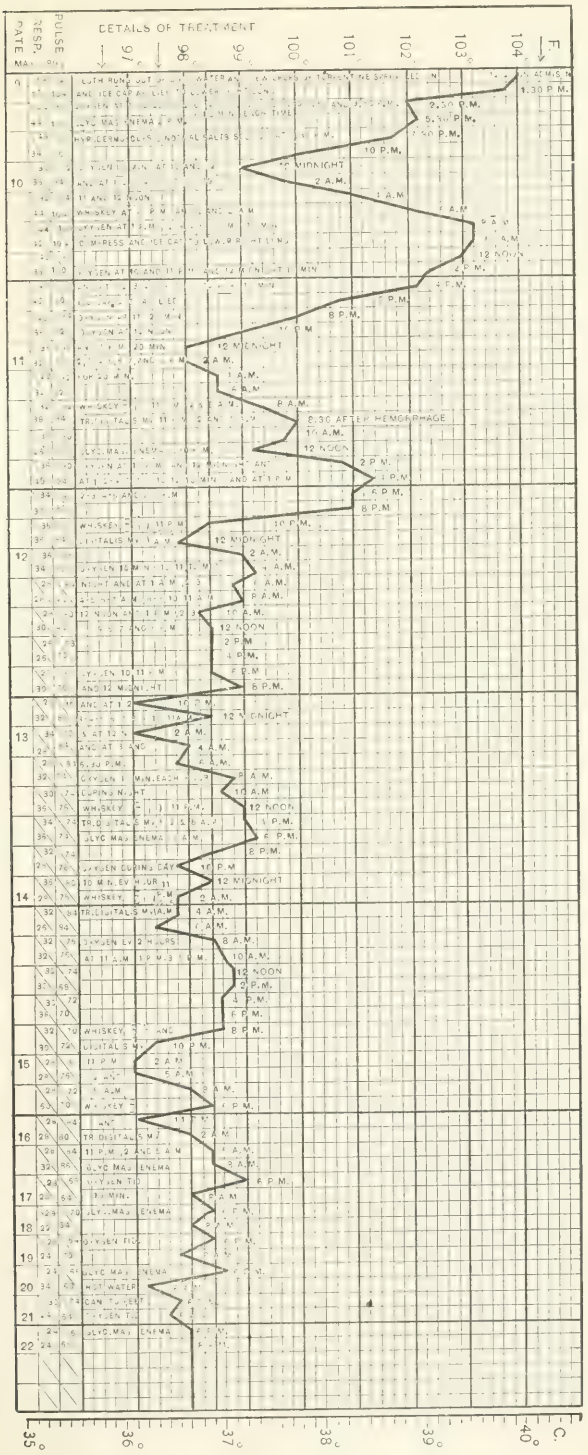
May 10.—At nine A.M. the temperature was 103° F.; pulse, 100, and respirations, 44. At six P.M. the temperature was 101°, and kept falling during the night until midnight, when it was 98°; pulse, at this time, was 96, and respirations, 32.

May 11.—At nine A.M. the patient coughed up about an ounce of bright, frothy blood, which subsequently coagulated. At midnight the temperature fell to 97° F. Convalescence from this time was established.

CASE VII.—Double pneumonia; typhoid-like chart, with very gradual lysis. Normal temperature on ninth day, and convalescence from that time.

John B., aged thirty-seven years, barber, native of South Carolina, admitted April 17, 1899. Illness began on 15th, with pain in chest, headache, and prostration. Physical examination revealed distinct signs of pneumonia in the lower lobes of both lungs. Patient


DETAILS OF TREATMENT
PULSE
RESP.
RATE
97
98
99
100
101
102
103
104
F.
PLUNGED AT 103 F.
PILLITHY
SPONGE
NORMAL
APPLIED COLD COM
STRYCHNIA
HYPODERMICALLY
NORMAL SALT SOL.
AMMONIA
MUSTARD AND WATER
OXYGEN AT INTERVALS
35°
36°
37°
38°
39°
40° C.


DETAILS OF TREATMENT
PULSE
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2.30 P.M.
5.30 P.M.
7.30 P.M.
10 P.M.
MIDNIGHT
2 A.M.
1 A.M.
6 A.M.
12 NOON
2 P.M.
8 P.M.
12 MIDNIGHT
2 A.M.
1 A.M.
8.30 AFTER HEMORRHAGE
12 NOON
2 P.M.
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12 MIDNIGHT
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4 A.M.
12 NOON
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12 MIDNIGHT
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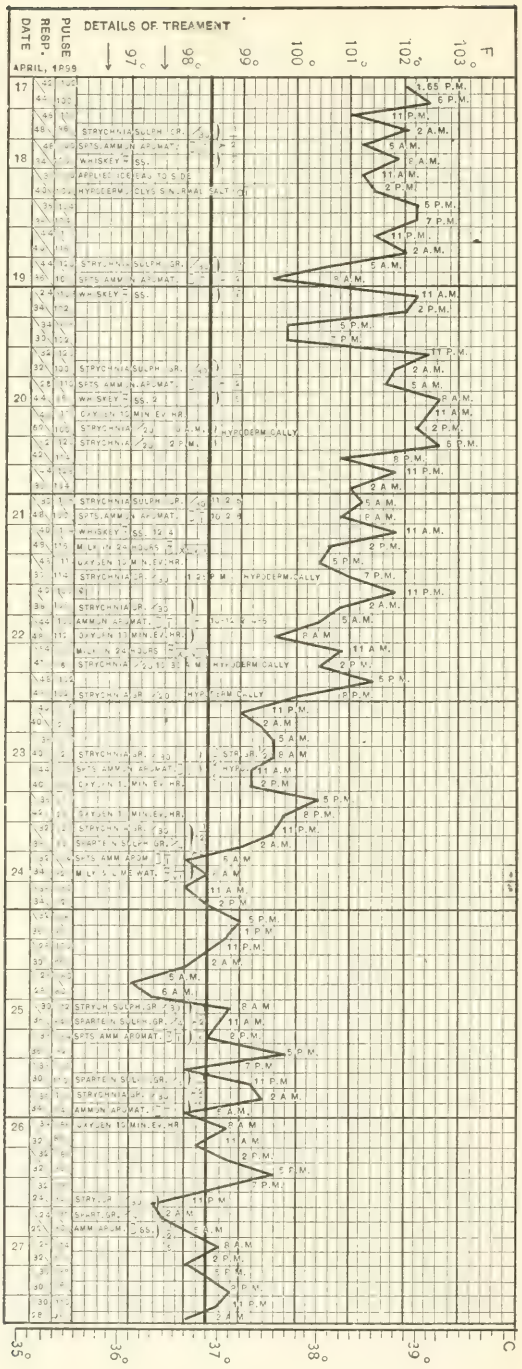
C.


DETAILS OF TREAMENT
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RESP.
PULSE
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99°
100°
101°
102°
103° F
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delirious. Temperature, 102° F.; pulse, 102; respirations, 42, and very labored. Stimulants were freely administered; cold compresses were applied to the chest, and oxygen was inhaled every hour for ten minutes.

April 18.—The consolidation is advancing, especially in the left lung, the apex of which is involved. Mental condition unchanged. Urine scanty and contains a trace of albumen. Hypodermoclysis, one pint.

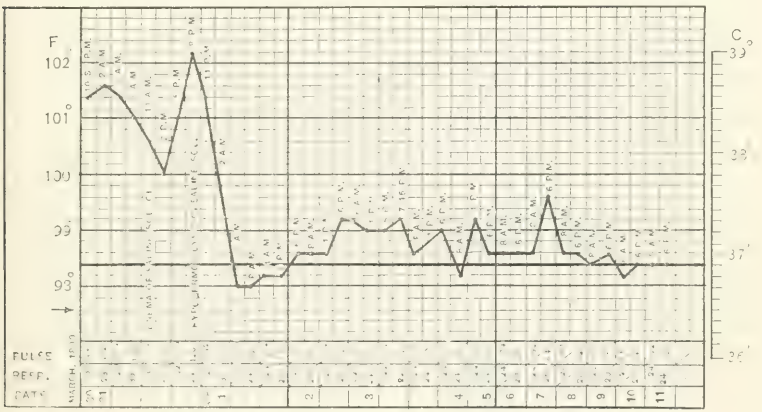
April 19.—Mental condition improved, but respiration still labored. Much complaint of pain in chest. The temperature at eight A.M. was 99.6° F., but during the day rose to 102°.

April 21.—Patient still delirious, although the character of the respiration has improved. Temperature is gradually declining.

April 24.—Temperature normal. Patient better in every respect. Convalescence rapid from this date.

CASE VIII.—The following case is the only one of the series in which recovery occurred by crisis, which is doubtless due to the fact that the disease had nearly run its course at the date of admission. It is also interesting because of the presence of the malarial organism in the blood.

John K., aged forty-four years, Irish, laborer, admitted March 30, 1899. One week previously he was exposed to cold and damp-



ness, and was seized with a chill and pain in the side just below the left nipple. On admission the temperature was 101.5° F.; respirations, 30, and pulse, 140. The rate of the latter declined in a few

hours to 112. Distinct signs of consolidation at apex of left lung, giving rise to suspicions of tuberculosis. The viscid character of the sputum, its freedom from tubercle bacilli, the history of the case, and the patient's facies, soon rendered the diagnosis certain. At five P.M. of the 30th, one pint of saline solution was injected beneath the skin of the thigh. At this time the temperature was 101°. The following morning, at five A.M., the temperature was normal, and so continued until April 20, when he had a well-marked malarial chill, followed by the usual phenomenon of a malarial paroxysm. The hæmatozoon malariæ was found in the blood. Quinia was not administered, but the chill did not recur. The patient remained in the hospital until May 7, when he was discharged cured.

Two more cases, making ten in all, were treated successfully by hypodermoclysis, but of these the notes are not forthcoming. One of them, Peter R., aged seventy-seven years, is still in the hospital. This case is perhaps the most remarkable of all, and deserves a brief mention. The patient, a German, has been in the hospital a year or more, and has been examined by hundreds of students, who, like their instructors, have listened with great interest to a loud musical systolic murmur which may be heard over his entire cardiac region. During my recent service, this man was attacked with acute pneumonia. At first his symptoms were most alarming, and, on account of his advanced age and cardiac disease, but little hope of his recovery was entertained. After free hypodermoclysis, his symptoms improved, and he was soon out of danger.

Two cases (XI. and XII.) terminated fatally. They were both men, aged thirty-eight and forty-five respectively. One died twenty-four hours after admission, the other within thirty-six. They were practically moribund when admitted.

Here, then, is a record of ten "Blockley" cases of pneumonia treated successfully by hypodermoclysis. Of these ten, one was a man of seventy-seven, with cardiac valvular disease; another an infirm woman of sixty-three, and two were cases of double pneumonia. The others, with perhaps the exception of the Italian, Philip L., were more or less addicted to alcohol. The conclusion seems justifiable that the recovery in these cases was largely due to the line of treatment pursued. The criticism may be made that hypodermoclysis was not exclusively relied upon. It is true that in some of the cases ice-bags were applied to the chest, and that in all ammonia, strychnine,

whiskey, and oxygen were administered. Nevertheless, I am firmly convinced that the hypodermoclysis was the most efficacious of the measures employed; and I say this because my treatment of Blockley cases of pneumonia by the ordinary supporting methods, minus hypodermoclysis, has yielded most unsatisfactory results.

A pertinent question to which this article may give rise is the following: "Why, if hypodermoclysis was found so advantageous in 1889, was it abandoned for a period of ten years?" To this I reply that it was not abandoned, but was used in a desultory manner during that long interval, and with encouraging results. For reasons already referred to, the notes of many of my cases are not forthcoming. As all hospital physicians are aware, a clinical investigation is greatly encouraged by the co-operation of a zealous and intelligent interne. In 1889 and also in 1899, I was so fortunate as to be aided in this special mode of treating pneumonia by gentlemen who were quite as much interested in it as I myself, and I hereby tender my acknowledgments for their effective assistance to Dr. Samuel McClintock Hamill, interne at the Philadelphia Hospital in 1889, and to Drs. V. S. Merritt and F. A. Sherrer, internes in 1899.

I advance no claim to priority in the use of the method here advocated, although, as far as I am aware, I was the first to employ it systematically. In a paper on the "Treatment of Croupous Pneumonia," read at the meeting of the Association of American Physicians in 1894, Dr. Beverly Robinson suggests the employment of hypodermoclysis after bleeding, and states that Dr. Cunningham, of Ensley, Alabama, had employed the method "with the object of preventing cardiac failure which he thinks may be due to ante-mor tem clot." In the discussion of Dr. Robinson's paper, Professor James C. Wilson called "the attention of the association to the fact that this method has been practised to a considerable extent in the wards of the Philadelphia Hospital by Dr. Henry;" although Professor Wilson was mistaken in the statement that I had published a report of my cases. This is the first time that I have published any such report; although, through the numerous students who have attended my clinics at the Philadelphia Hospital and elsewhere, as well as through the internes who have served in my wards for the last ten years, the treatment of pneumonia by hypodermoclysis as pursued in the Philadelphia Hospital is known far and wide. Dr. Cunningham's paper appeared in the *Virginia Medical Monthly* for

December, 1893, and contains a record of sixteen cases of pneumonia treated by hypodermoclysis in the spring of that year,—*i.e.*, four years after I had begun to employ the method in the Philadelphia Hospital. Dr. Cunningham's description of the post-mortem findings in cases treated with and without hypodermoclysis is most interesting, and seems to warrant his conclusion that "cardiac thrombosis may be prevented, or at least mitigated, by hypodermoclysis." Apart from its reference to hypodermoclysis, Dr. Cunningham's paper is a valuable contribution to the literature of pneumonia.

THE TREATMENT OF NON-MALIGNANT STRICTURES OF THE ŒSOPHAGUS.

BY W. J. MAYO, M.D.,

Surgeon to St. Mary's Hospital, Rochester, Minnesota.

BENIGN strictures of the œsophagus are most commonly cicatricial in character, and follow the healing of an ulcerated surface: the swallowing of caustic alkalies, acids, or other corrosive chemicals giving rise to the ulceration in the majority of cases. In a few instances direct injury, such as a stab-wound or the prolonged lodgement of a foreign body, has been the exciting agent. Syphilis and tuberculosis have, rarely, occasioned the formation of the scar-tissue, and even the so-called "peptic ulcer" has been known to give rise to a simple stricture. Congenital strictures and those of the large fibrous variety form a small group in which ulceration is not supposed to precede the obstruction.

The prophylactic treatment of traumatism of the œsophagus at an early period, before contraction takes place, is of the utmost importance. Many of the unfortunate results in this way can be avoided or rendered manageable. After the swallowing of a caustic substance systematic sounding should be commenced in from two to four weeks.

Tillman strongly advocates preliminary gastrostomy for feeding purposes in the primary stages of acute ulceration, thereby lessening the infection and hastening cure. In tubercular and syphilitic ulceration appropriate constitutional treatment should be used in conjunction with the sounding during the period of cicatrization.

Foreign bodies should not be allowed to remain in the œsophagus until ulceration is produced, and prolonged attempts at removal through the mouth cannot be considered good surgery. The X-ray is of great service in locating many of these obstructions, and greatly aids early relief before ulceration results. Gradual dilatation is the method of choice for the relief of strictures, and the larger and softer

the dilator the better, but in many advanced cases such instruments are worthless. In these cases the use of olive-tipped whalebone probes are best for the smaller varieties, and for the larger bougies a whalebone stem to which increasing sizes of metal or ivory tips can be attached are the most valuable. If the tip is made very long and tapering it will engage in the stenosed portion more quickly than the ordinary olive tip, which expands so rapidly that one cannot easily appreciate whether it is engaged in the stricture or not.

Fig. 1.

Showing the shape of good probes.

Theoretically, the Trousseau œsophageal bougie, in which three or four increasing sizes of bulbs are made on a single stem, would seem to be an ideal one, the idea being that the small tip would railroad the others through. As a matter of fact, it prevents that elasticity within a few inches of the tip which is a prime essential in a good bougie, enabling one to pass through the curved pharynx without injuriously impinging on the posterior wall. This elasticity is necessary, as it also permits of some play at the point, and facilitates search of the face of the stricture for the opening.

Many cases appear to be impermeable to the probe, which in time may be safely passed. The frightened little sufferer adds to the general discomfort, and renders a hasty judgment in this regard only too natural. With care and gentleness a bougie can usually be inserted in the opening, although several sittings may be required. In such cases a number of whalebone bougies lubricated with glycerin should

be passed in the gullet and against the stricture in the same manner as filiforms are used in the urethra, and by alternating probes one will usually slip through. It is best to stop here, and then every other day repeat the process, using, perhaps, several increasing sizes at one sitting; the first probe introduced should have a very flexible handle, and when in place straightens the throat curve so that the larger and stiffer bougies readily follow, each one being left in the stricture until the next one is ready by its side. George Woolsey calls attention to the great danger of perforation in late cases, especially if the pouch formed above the stricture is of large size. In a few cases it may be necessary to use an anæsthetic the first time or two; but usually the patient will sit on a low stool facing the operator, and, from the relief afforded by the ability to retain a little nourishment, will soon face the ordeal with an unexpected degree of fortitude. The frequency of sounding depends on the case, every other day being sufficient, and, in some sensitive cases, once or twice a week gives the best results. Many months are occupied in this gradual dilatation, and after apparent cure a sound should be passed occasionally for years.

Stricture of the Œsophagus; Gradual Dilatation.—T. C., male, aged two years, admitted to St. Mary's Hospital, Rochester, Minnesota, February 24, 1898, with a history of having accidentally swallowed concentrated lye seven weeks previously. Difficulty in swallowing developed at once. At first this was due to traumatism and resulting ulceration, later to the contraction. At no time since the injury has solid food been taken, and a large part of liquid nourishment swallowed is regurgitated. Before admission to the hospital, several attempts at sounding the œsophagus had been made, but without success.

On examination, a stricture was detected in the thoracic œsophagus. Under anæsthesia, several whalebone bougies were placed in position, and, by using first one then another, a probe was finally passed into the stomach. The stricture dilated easily, and a fair-sized bougie was introduced at this time. Systematic sounding every third day was carried out, and March 8, 1898, the little patient was discharged, able to take liquids easily and chopped meat and softened bread with but little difficulty.

DENSE STRICTURES.

Stenosis involving a large extent of the œsophagus may prevent gradual dilatation, or even continue to contract while attempts at dilatation are being carried out; and in a few cases the difficulties and dangers attending the sounding of a tight stricture make a resort to some more rapid method desirable.

For strictures in the vicinity of the cricoid cartilage, external œsophagotomy after Billroth is the operation of choice. Like the perineal cut for stricture of the urethra, funnel-shaped retraction of the cut portion is caused by adhesion to the external tissues divided, and it lessens future contraction. This operation, first performed by Mitchell and later by Annandale, has stood the test, and should not be long delayed. A most interesting case of this kind is recorded by Christian Fenger. Kendall Franks has successfully performed œsophagotomy in a case of simple stricture in this portion of the œsophagus, the divided ends being sutured over a tube passed through the nose.

For strictures above the arch of the aorta and below the point which can be directly divided, Gussenbauer's combined external and internal œsophagotomy is the best operation; through an external incision in the neck a tenotome is introduced and passed downward to the stricture, which is then divided.

Two Strictures of Œsophagus; Prolonged Dilatation and Combined Œsophagotomy.—J. H., aged four years, seen in January, 1893. In the spring of 1892 the child swallowed concentrated lye. After a month's severe illness, he gradually recovered, but with an increasing difficulty in swallowing. During the past three months all food had to be strained, and he has had frequent attacks of regurgitation. On the introduction of a catheter, it was arrested at the isthmus of the gullet. After some manipulation, a No. 3 urethral catheter was passed three inches farther downward, where it was completely arrested.

It was very evident that there was a stricture at the level of the cricoid cartilage, and a second in the intrathoracic portion of the œsophagus. Regular sounding was instituted and continued at intervals of three to ten days, with but slight interruption for one year. At the end of two months the lowest stricture was passed by a fine whalebone bougie. This stricture was very dense, and resisted sound-

ing obstinately; it would be only at intervals of several sittings that the bougie could be introduced into the stomach. At the end of a year's perseverance the upper stricture had yielded only to the extent of admitting a No. 5 catheter, and the lower one a No. 3. On February 15, 1894, he was admitted to St. Mary's Hospital, Rochester, Minnesota, and on February 16, 1894, left external œsophagotomy was performed by Dr. C. H. Mayo. The upper stricture was not readily dilated by forceps. The lower stricture, which was below the level of the upper end of the sternum, was carefully nicked with a dull knife on a grooved director and dilated with forceps, permitting of easy catheterization of the œsophagus. Unfortunately, the majority of dense strictures are in the lower œsophagus, or, if there is one stricture in the upper portion, another will usually be found lower down. In three cases in the experience of the writer more than one stricture was present, but the lower in each instance was the more dense.

How to reach strictures situated below the arch of the aorta in the thoracic œsophagus by direct means has been, and is yet, a problem. Nasolloff, Quenu, and Hartmann developed an operation for external œsophagotomy on the cadaver, which Rehn first performed on the living subject; an incision from the fourth to the eighth rib on the right side of the spinal column being employed. The difficulties and dangers of this plan of attack are so great that indirect measures are to be relied upon. For this purpose two methods are available,—Abbe's string-saw and Ochsner's operation; in the latter a loop of rubber tubing is used as a dilating medium. The one supplements the other. Division of the stricture by the string-saw invented by Abbe has been performed by a number of operators with great success. Dr. H. M. Silver finds thirty-eight cases on record. Through a gastrotomy wound a stout silk cord is passed retrograde through the œsophagus and out through the mouth or through an external œsophagotomy. The stricture is made tense by engaging bougies into it from below, and by a sawing motion of the cord the tight bands are divided; while the important soft parts are crowded back out of the way, the incisions can then be closed. In the majority of cases full dilatation cannot be secured at a single sitting, and a gastrostomy should be performed. By tying the ends of the string projecting from the mouth to the ends hanging from the gas-

tric fistula, the process of division can be carried on at intervals until full dilatation is secured.

Stricture of Œsophagus; String Division; After Gastrotomy and External Œsophagotomy.—H. W., aged three years, admitted to St. Mary's Hospital, Rochester, Minnesota, on October 5, 1892. One year previously the child accidentally swallowed caustic lye. During the last six months she has had great difficulty in swallowing liquids, and has regurgitated from the œsophagus more than half the nourishment taken. Bougies were inserted into the œsophagus, but were completely arrested at its lower end; careful search of the face of the stricture with a number of whalebone bougies, under anæsthesia, failed to pass the stenosed portion. Proper manipulation was much interfered with by the short, sharp curve of the child's pharynx and its small size; therefore external œsophagotomy was urged upon the parents to permit of more direct access to the parts involved. This was declined, and the little girl was taken home at the end of two weeks.

On July 19, 1893, the child was readmitted to the hospital. A gradual closing of the small channel had taken place, and for the past four weeks it had been nearly, if not quite, impermeable, so that the little patient had been nourished by rectal enemata. She was emaciated to a marked degree. As before, careful search utterly failed to pass the stricture. External œsophagotomy with a hope of finding a way through the damaged œsophagus did not promise the rapid relief that the child's nutrition demanded; therefore, on July 20, 1893, a gastrostomy was made.

The child was now well nourished through the gastric fistula, and twice a week the lower face of the stricture, which was at the diaphragmatic opening, was carefully searched for an outlet.

On two occasions the finger was introduced through the fistula into the stomach and used as a guide for the probe, the patient being anæsthetized. The dilatation of the fistula necessary to introduce the finger in so small a subject greatly increased the leakage through the gastric opening, and the child again began to fail, from the inability of the stomach to retain nourishment.

On August 25, 1893, a left external œsophagotomy, at a low point in the neck, was performed by Dr. C. H. Mayo, and a bougie was introduced by him through this opening and pressed against the stricture, pushing it downward into the stomach and holding it

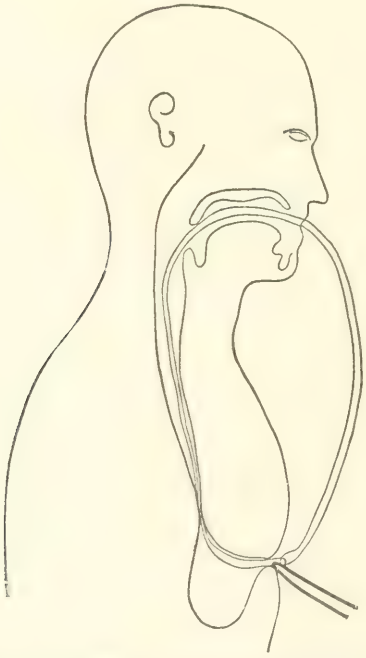
steadily. With a finger in the stomach, careful search now enabled me to pass a long malleable German-silver probe from the stomach through the stricture and out of the œsophageal fistula in the neck, and a heavy double strand of braided silk was drawn through the channel, having an end out of the opening in the œsophagus, and also out of the gastric fistula. By using one strand to cut the tissues, after the method recommended by Dr. Robert Abbe, while knots were tied on the second strand and pulled into the obstruction to keep the stricture tense, the opening was greatly enlarged. In five weeks the threads were removed, and dilatation was carried on with olive-tipped whalebone bougies made for the purpose.

Ochsner's method is performed as follows: The anterior wall of the stomach is drawn out of a left oblique incision through the abdominal coverings; a small opening is made into the stomach sufficient to introduce the finger. A whalebone probe, to the tip of which a silk string guide has been tied, is now passed through the œsophagus either from above or retrograde, as in the Abbe method. With this guide a loop of silk is drawn out of the gastric incision in such a manner as to leave the guide as a third string. Into this loop a small, soft rubber drainage-tube three feet or more in length is caught in the middle; by the traction on the ends of the doubled thread through the mouth, this loop of rubber tube is drawn through the stomach and made to engage in the stricture. The greater the amount of traction the smaller the stretched rubber tube, until it is sufficiently reduced in size to enter the stenosed portion; by alternating the direction of the pull, the tube is drawn out by its free ends and in by the silk loop. Care should be taken not to use too much force, as there is danger of tearing the stenosed portion and permitting infection of the mediastinal space. If necessary, the third string can be used as a string-saw after the Abbe plan of procedure. This operation was first successfully performed by Dr. A. J. Ochsner, of Chicago, in February, 1899. In April, 1899, I had an opportunity to employ this method, with the most satisfactory result.

Stricture of the Œsophagus; Gastrostomy and Dilatation by Ochsner's Method.—G. H., a female, aged nine years, was admitted to St. Mary's Hospital, March 3, 1899, with the following history: Four months before she accidentally swallowed concentrated lye. The ulceration produced was slow in healing and the difficulty in swallowing gradually became more pronounced. For the last two

months only liquids have been attempted, and the greater part has at once been regurgitated. Emaciation extreme. On examination, a stricture in the lower œsophagus was readily detected by the bougie. After considerable effort a fine whalebone probe was passed. Systematic probing during the next seven weeks did not yield much result; occasionally, a larger probe could be passed, and again only the finest could be used. During this time rectal feeding was employed to supplement the very limited nourishment obtained by means of the œsophagus. The little patient became so reduced that

FIG. 2.



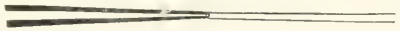
Showing the silk cords in place and the rubber tube ready for introduction.

on April 20, 1899, the abdomen was opened and the stomach incised. A fine probe armed with a silk thread was passed through the œsophagus into the stomach. The thread was caught and drawn out of the incision; by this means two threads of heavy silk were drawn upward and the silk guide left in position.

A quarter-inch rubber drainage-tube was lubricated and caught by the middle in the loop; by traction from above the tube was drawn through the stomach and into the œsophagus, considerable

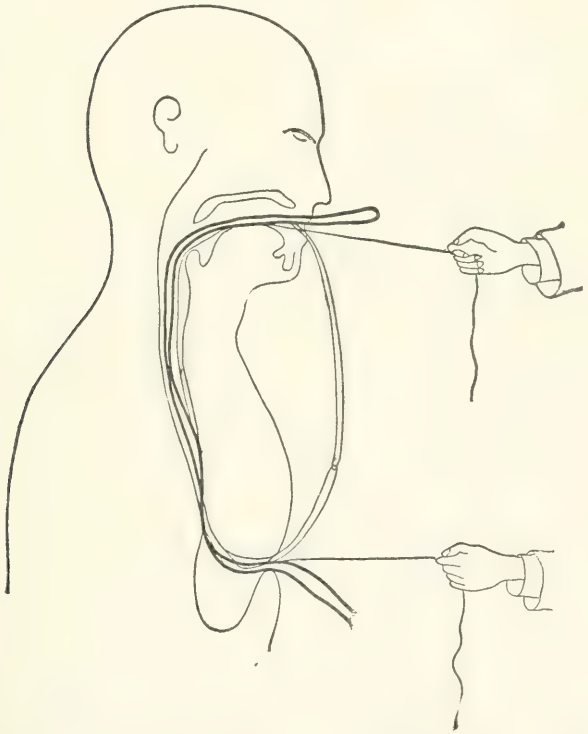
traction being required to engage it in the strictured area. By first using traction upward on the strings and then downward on the free ends of the tube, the stricture was rapidly dilated. The dilating tube was removed, and a half-inch rubber tube was introduced into the gastric opening, and through this tube the three threads were drawn, the free ends being tied to the ends projecting from the mouth.

FIG. 3.



Showing the effect of traction in aiding the tube to pass a tight stricture.

FIG. 4.



Showing the rubber tube in position and a third string being used as a saw.

A gastric fistula was then formed after the method of Bernays, the rubber tube being enclosed by three superimposed circular purse-string sutures of catgut, one-fourth of an inch apart, introduced in the wall of the stomach around the incision. The margin of the fistula was then sutured to the abdominal wound. This caused a

cone or nipple-like projection of the wall into the lumen of the stomach. The general condition rapidly improved, and systematic sounding was carried on as before, with increasing sizes of bougies.

Internal œsophagotomy, first performed by Maisonneuve in 1861, has been made about twenty-five reported times (Richardson), with a death-rate of over twenty-five per cent. Above the arch of the aorta it is unnecessary, below it is a chance shot and success a lucky accident. Koenig believes that permanent gastrostomy is preferable. Sands's instrument shares with Mackenzie's the doubtful honor of being best for the purpose. Meyer, in an interesting summing up of internal instrumental œsophagotomy, says that the danger of accidental injury to important structures is not greater than the introduction of infective material without the gullet, such infections being responsible for more than half the mortality.

He recommends gastrostomy for the purpose of feeding, and also to allow of preliminary cleansing of the operative field, if internal instrumental œsophagotomy is adopted. Internal divulsion is nearly as dangerous as the cutting operation and less effective. Fletcher's œsophageal divulsor has been used a few times. Dr. S. J. Mixter has devoted a great deal of attention to this subject. He recommends that Symond's tube, as originally advocated for malignant strictures, be introduced, and believes that steady pressure will gradually increase the caliber. The literature of the subject is filled with cuts of more or less ingenious intruments for the purpose of dilating these strictures; the spiral rolled tin sounds of Rosenheim, the laminary tent of Senator, and a host of others, interesting but of questionable value; of these, linear electrolysis, as introduced by Le Fort, has had the greatest reputation. The marvellous nature of the cures wrought in many cases leads one to think that the enthusiastic advocates of electricity failed to exclude the spasmodic variety with sufficient care. One hears much less of the cure of strictures in this manner than a few years ago.

IMPERMEABLE STRICTURES.

In a moderate number of strictures a probe cannot be passed through the mouth, yet after an external œsophagotomy the bougie can be manipulated to so much better advantage that the opening may be found and, after a few soundings, conducted through the fistula; the future dilatation is continued through the mouth.

Graser particularly advises this in children. Kammerer reported a case before the New York Surgical Society in which, after failing to pass the stricture by retrograde soundings through a gastric incision, success followed probing from above through an external œsophagotomy. Koenig had a series of fine silver balls made and threaded; one swallowed at bedtime would usually pass the stenosed area during the night, and was drawn back through by the thread in the morning. Zeeheisen records two cases in which an opening passable to a sound was secured in this manner. Billroth succeeded in several cases with a cylindrical cloth bougie partly filled with mercury, the weight and adaptability of the metal carrying it through.

Gastrotomy and retrograde dilatation were recommended by Schede in 1883, and first performed by Trendelenburg. Kendall Franks collected twenty cases cured in this manner. Since that time a large number of successful cases have been recorded. Great and unexpected difficulty is often experienced in attempting retrograde dilatation through a gastric fistula. It is a surprising fact that under such circumstances it may be next to impossible to find the cardiac opening. For this reason the dilatation should be carried out as the primary operation, if possible.

Richardson directs that the anterior wall of the stomach be delivered, and a small transverse incision made into its cavity near the lesser curvature, in the neighborhood of the pylorus; by traction on the stomach just below this incision, the lesser curvature forms a sulcus along which the instruments glide into the cardiac orifice. Abbe says that the cardiac orifice closes so completely that its site can hardly be detected with the finger, but that if a little pressure is made upon it a dimple or pit-like opening will soon be apparent. Abbe further recommends that a string guide be introduced by which dilating bougies can be drawn upward retrograde, and directs that this guide should be retained in place until a sound can be introduced from above. Observation has shown that it is impossible to pass an instrument retrograde when impassable from above, but that regular dilatation from below without a guide may prove very difficult.

It may happen that the condition of the patient will not permit prolonged attempts at retrograde dilatation, and a rapid gastrostomy should be done by the Witzel or the multiple purse-string method of

Bernay, as either permits immediate feeding, does not leak, and yet can be readily converted into a direct opening when needed for later attempts at retrograde dilatation. With the improvement in nutrition which follows gastrostomy and the absolute rest to the œsophagus, in a short time a probe may be passed from above.

Cicatricial Stenosis of the Œsophagus; Gastrostomy; Gradual Dilatation through the Mouth.—V. M., aged three years, was admitted to St. Mary's Hospital, Rochester, Minnesota, July 1, 1894. Nine months previous to admission the little fellow had accidentally swallowed concentrated lye. Symptoms of œsophageal obstruction becoming more and more pronounced, attempts were made to dilate the strictured gullet without success. At first solids were regurgitated, later fluids, and for six weeks nourishment had been maintained by rectal feeding.

The child is emaciated to an extreme degree, and is too feeble to stand. Fluids were eagerly swallowed only to be at once regurgitated. Attempts to pass whalebone probes through the stricture were unavailing. Gastrostomy after the Witzel method was performed and immediate feeding resorted to.

Regular feeding through the gastric fistula soon improved the general condition. Systematic search for an opening through the stricture from above was made every other day for several weeks before a small whalebone probe passed. After this success, the bougie failed to find the orifice a second time for a number of days. Three months of persistent effort finally developed a moderately sure passage. For five months all the feeding was carried on by the gastric fistula, a good-sized opening through the stricture having developed by this time.

On February 22, 1895, the patient was discharged, being able to eat ordinary food, and since that time he had been regularly sounded.

There will yet remain a few cases in which a large part of the œsophagus is obliterated, and permanent gastrostomy is the melancholy outcome.

ALBUMINURIA IN HIGH ALTITUDES, AND ITS TREATMENT.

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THE effects of altitude upon urinary disorders is a subject which has as yet received but little consideration. The advantages of an elevated abode to sufferers from albuminuria are, briefly, first, increased vicarious action of the skin and lungs, owing to diminished barometric pressure and low humidity; and, second, exalted hæmatosis and general invigoration due largely to abundant sunshine. The disadvantages which accrue to altitude are the prevalence of winds, the marked difference in temperature between sun and shade (40° or 50° F.), and, particularly, the sudden atmospheric changes to which all mountainous regions are liable. As an instance of the last-mentioned fact, the writer has seen the mercury at Denver (altitude one mile) fall nearly fifty degrees in about twenty minutes. On the other hand, these sudden temperature variations may, in suitable cases and with proper precautions against exposure, exert a distinctly beneficial tonic action upon the whole system.

Concerning the mortality from albuminuric diseases at high altitudes, what statistics are available show a relatively low ratio in this regard as compared with the Eastern States, though higher than in the South and in Great Britain. The Denver Health Commissioner's report for 1897 gives eighty-eight deaths due to urinary affections—seventy-seven from nephritis alone—in an estimated population of one hundred and sixty thousand. The same pamphlet records for 1898 (population, one hundred and sixty-seven thousand) ninety-eight deaths from diseases of the urinary system, eighty-five of which were due to Bright's disease in its various forms. In the former year the death-rate from renal diseases amounted to one in twenty-four; in the latter to one in twenty-three of the total.

There is no doubt that the gravity of all acute inflammations is increased by altitude, and acute nephritis is especially dangerous at great elevations. The scarlatinal variety is here, as elsewhere, the most amenable, and is seldom fatal. Chronic parenchymatous nephritis appears to progress to a lethal termination more rapidly than at lower levels. The chronic interstitial type of the malady is relatively rather infrequent, which may be attributed, perhaps, to the comparatively younger average age of our population. It is these cases of cirrhotic kidney that react most favorably to the stimulating climate of Colorado, except in the third stage, when cardiac dilatation militates against a residence here. Amyloid degeneration is not nearly so commonly observed in this section as one might suppose. In something over six thousand urinary examinations, I recall not more than a dozen cases of renal amyloidosis. Suppurative nephritis is fully as frequent a sequel of obstructive infection of the lower urinary tract here as elsewhere.

Non-nephritic albuminuria differs little in occurrence and etiology from the forms observed in other localities. Functional albuminuria due to excessive bicycle riding is probably noted more frequently in Denver than in Eastern cities, owing to the tempting opportunities afforded by good roads nearly all the year around. Traces of albumen are found very often here in the urine of neurasthenic patients, who seem, as a rule, to tend to grow worse at this altitude. Another common source of slight amounts of albumen is in the renal irritation resulting from increased density and acidity of the urine, caused by the augmented functional activity of the skin and the lungs. Many adult persons, apparently healthy, pass no more than a pint of urine daily in this city. It is hardly necessary to remark that the predisposition to nephrolithiasis is correspondingly increased by such marked diminution of the watery renal secretion. Urinary tuberculosis, when carefully sought for, is found in a large minority of the pulmonary invalids who resort to this clime.

Viewed from the stand-point of clinical experience, I would say that high altitudes on the whole do not offer a desirable place of residence for the victims of Bright's disease. For these individuals, a warm, dry, equable climate, such as that afforded by Arizona or Egypt, is best adapted to restore health or prolong life. Nevertheless, as already intimated, the tonic qualities of a rare, dry atmosphere may do much good in the early stages of lithæmic nephritis,

particularly when an out-of-door vocation is followed as far as practicable.

The chief point in prophylaxis against acute exacerbations in all chronic renal lesions is the prevention of surface chilling and internal congestion. This desideratum is to be secured only by clothing the body warmly, yet not to excess, wearing woollen hose and undergarments throughout all the seasons. The necessity of this hygienic precept cannot be too strongly impressed upon renal patients who are about to sojourn or make their homes at higher altitudes, and extraordinary care in this respect should be enjoined during convalescence from acute attacks.

In the treatment of renal disease, either acute or chronic, the capital indication is to make the work of the kidneys as light as is practicable,—to secure functional rest to them. The skin and the bowels are to be made to take on a part of the labor of their afflicted fellow-organs. That this is a natural method of relief is shown by the occurrence of critical sweats, vomiting, and diarrhœa in chronic nephritis.

In acute nephritis, particularly the scarlatinal variety, no other measure relieves so promptly the serious symptoms of dropsy, dyspnœa, coma, or convulsions as the use of the hot-air bath once a day, or more often, for a sufficient period to excite copious diaphoresis. A simple arrangement for this purpose consists of a tin tube bent at a right angle (a stovepipe elbow will answer) and wrapped in cloths to protect the bedding. One end of the tube is held over a spirit or kerosene lamp; the other projects under the blankets which cover the patient, but are kept from contact with him by means of half-hoops or other utensils. Pilocarpine hypodermically is a valuable adjuvant, especially for the first few treatments, until the skin becomes accustomed to its vicarious office. But this drug should be used cautiously, if at all, whenever the heart is weak or there is a tendency to pulmonary œdema.

In mild cases the full hot bath for twenty or thirty minutes (wrapping the child up quickly in a warm blanket without dressing before carrying to bed), or the warm pack for a half-hour to an hour, or even mild diaphoretics, such as the spirit of ammonium acetate, will usually suffice for perspiration purposes. Chronic nephritis, particularly the cirrhotic type, which shows the most marked reduction of urea and other normal salts, is greatly benefited by the regular

use of the Turkish bath at least once weekly. This measure is peculiarly advantageous in high altitudes, I have reason to believe.

Renal disorders are always aggravated by constipation, as this raises arterial tension to a marked degree. Yet, in the writer's opinion, it is not wise to purge the patient drastically, except when threatening uræmic symptoms demand vigorous correction. Ordinarily, a Seidlitz powder, a bottle of citrated magnesia, or an ordinary dose of effervescent sodium or magnesium sulphate, taken in a glass of cold water before breakfast, will procure a sufficient evacuation, especially if substituted occasionally by vegetable laxatives, such as aloes, colocynth, and cascara. Potassium bitartrate is an excellent hydragogue in the albuminuria of pregnancy. Cream-of-tartar lemonade is a useful and palatable beverage in post-scarlatinal nephritis. Calomel in full doses has often a most admirable combined cholagogue and diuretic effect in the same affection when the urine is nearly or quite suppressed. In uræmic storms, one must resort without delay to effectual doses of compound jalap powder, scammony, elaterium, or croton oil.

Critical diarrhœal attacks ought not to be checked too quickly; one should endeavor rather to encourage the elimination of retained toxæmic substances, and in this way strike at the root of the difficulty. If it is deemed necessary to employ direct counteractives for the intestinal flux, a combination of aromatic spirit of ammonia and any vegetable astringent will prove effective.

Of the large number of diuretics utilized in renal affections, pure water, preferably distilled, is the safest and best. It is indicated in all forms of kidney trouble, and practically at all stages of these. Plentiful draughts of water do not simply increase the volume of the urine and thereby diminish its irritant properties, but they also largely augment the excretion of the solid ingredients. One of my patients with chronic nephritis more than doubled his daily output of urea by drinking nearly a gallon of water each day. The water may be taken carbonated with more gusto, as a rule, than when plain. As a mode of suggestive treatment, more than for any other reason, suitable mineral waters may be advised in regular quantity. More fluid is required, probably, to produce the same physiologic effects at high altitudes as at sea-level.

In tubal nephritis, both acute and chronic, the organic acid salts of the alkali metals, of which potassium citrate is likely the most

acceptable, are used extensively and with undoubted benefit as an aid in partially dissolving and washing out tube-casts and *débris* from the renal parenchyma. These salts are best given in sufficient amount to render the urine alkaline in acute attacks, but in chronic conditions should not be pushed to this extent for fear of the formation of phosphatic concretions.

Digitalis is indicated as a diuretic only when arterial blood-pressure is below normal. It is a superior and almost unique remedy for the albuminuria of passive congestion, or cyanotic induration, of cardiac origin. It is also of great value in the more advanced stage of acute nephritis with threatened suppression, and for the cardiac dilatation of the last year of fibroid kidney. This drug is contra-indicated, except on rare occasions, in the initial and the compensatory periods of interstitial nephritis and in the early stages of active renal congestion. The infusion is usually preferred in renal therapy. An objection to digitalis is that it decreases the excretion of urea. Because of this fact, I have used, with apparently good results, strophanthus instead in a number of cases.

The administration of iron, negatived during every acute inflammation, is of prime importance in the convalescent period of acute and in chronic tubal nephritis. Owing to the constipating qualities of the mineral acid salts of this metal, the vegetable acid preparations, particularly the double scale compounds, are commonly employed. Basham's mixture (mistura ferri et ammonii acetatis) is an old and trusted combination, used most extensively, perhaps, in the albuminuria of pregnancy and the puerperium. The syrup of iodide of iron is peculiarly adapted to combat post-scarlatinal anæmia in scrofulous children.

In the treatment of renal dropsy, we must rely chiefly on salines and the hot-air or vapor baths. Calomel and digitalis are likewise very serviceable in the early dropsy of acute nephritis. For massive anasarca, it is usually advisable to drain the serum from the connective tissues, by means of incisions over the malleoli or by the use of Southey's tubes, before resorting to medicines. Unless this precaution is observed, a uræmic attack is apt to be precipitated by the derivative action of hydrogogues and sudorifics.

The persistent high arterial tension of the earlier periods of chronic interstitial nephritis is best relieved by restriction of diet, a saline purge now and then, and forced sweating. If these meas-

ures do not suffice, the intermittent administration of nitrites will be found helpful. Sodium nitrite may be given in doses of three to five grains several times a day. Nitroglycerin is equally serviceable, beginning with one minim of the one-per-cent. solution, and gradually raising the dose, if necessary, to a point just short of cerebral distention.

Local renal symptoms are seldom complained of except in acute attacks or exacerbations. For lumbar pain and hæmaturia, dry-cupping, leeches, the digitalis-leaf poultice, and hot fomentations over the loins are all of service. Morphine, if used at all, should be employed with care. Cantharides plasters are never to be applied when renal inflammation is present. Partial or complete urinary suppression, from whatsoever cause, is often immediately relieved by copious injections of normal saline solution through the colon tube.

Albuminuria *per se* is hardly an object for rational treatment. Indeed, the daily loss of albumen and globulin, rarely more than half an ounce, is in itself no significant drain upon the system. Defective elimination, rather than abnormal loss of proteids, is what demands our attention as therapeutists. It is very doubtful, moreover, whether the numerous medicaments (tannic acid, ergot, arsenic, caffeine, fuchsin, etc.) which have been recommended to reduce the amount of albumen in the urine have any more efficient action in this direction than has pure water in plentiful potations.

Neither is the direct treatment of the renal lesions a promising field of therapy. The chloride of gold and sodium has been advocated by able authorities for cirrhosis of the kidneys; but it is manifestly impossible, in this insidious malady, to differentiate the good effects of specific medication from the benefits derived from other agencies. Mercurials and iodides, however, are doubtless serviceable in every nephritis of syphilitic origin. The internal use of urotropine and the older urinary antiseptics, in conjunction with large draughts of water, appears to diminish the volume of organic sediment in urinary tuberculosis and other pyuric conditions; but in these cases local irrigations and other surgical procedures are to be elected whenever feasible as giving more definite and satisfactory results. The removal of the cause, which is most frequently bone suppuration, is the main factor in the treatment of amyloid disease. Tonics and a varied, nourishing diet are likewise indicated.

The question of diet is of paramount importance in all renal cases. Acute nephritis particularly calls for food containing as little nitrogen as possible. In some instances even milk must be proscribed for a time, reliance being placed upon barley-gruel, arrowroot jelly, and other farinaceæ. In the stage of convalescence from acute attacks, milk should be the principal article of diet, its lactose serving as a special diuretic. Fish, eggs, and white meat are to be added tentatively, with due consideration for the chemical and microscopic characters of the urine.

In chronic nephritis, likewise, skimmed milk ought to be the basis of nutriment; yet few individuals will tolerate an exclusive diet of this liquid. The lessons of experience have impressed the writer, also, with the fact that chronic nephritics do best on a varied, mixed diet of milk, bread, fruit, and fresh vegetables (excluding the leguminosæ), with a minimum of flesh and fowl, to be discarded temporarily whenever uræmic symptoms supervene.

Alcoholics, spiced foods, meat soups, and other renal irritants are distinctly contraindicated.

It must always be remembered in these cachexiæ that the kidneys are but a part of the whole organism, and that they will share in every phase of general systemic improvement. Normal assimilation and intracellular oxidation have much to do with retarding retrograde changes in the kidneys.

Exercise in moderation, according to individual needs, is an essential in the proper treatment of chronic kidney affections. These patients should lead a perfectly quiet, regular, and uneventful life. Some congenial occupation, unattended with bodily fatigue or mental strain and worry, is preferable to the wandering tedium of habitual idleness.

THE TREATMENT OF RHEUMATISM, WITH REFERENCE TO ITS HEART COMPLICATIONS.

CLINICAL LECTURE DELIVERED AT THE NEW YORK POLYCLINIC HOSPITAL AND SCHOOL FOR GRADUATES IN MEDICINE.

BY JAMES J. WALSH, Ph.D., M.D.,

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GENTLEMEN,—We have had during the summer months a series of cases of cardiac lesions of all kinds. In a large proportion of the cases the valvular heart lesions were due originally to rheumatism. At least, in most of the cases, a history of rheumatism was not hard to obtain, and, though the patients themselves might not connect their present symptoms with the perhaps distant attack of rheumatism, and often insisted that they had gotten entirely over their rheumatism, and their present condition had begun to develop long afterwards, yet we felt justified in considering their heart lesion as due to the rheumatic attack.

Statistics fully justify this assumption, and careful observation and collation of cases shows that in considerably more than one-half the cases of acute rheumatism, endocarditis develops and leaves its trace on the valvular mechanism of the heart. Bouillard has deduced from a large series of cases a rule for the coincidence of endocarditis with rheumatism. According to this rule, it is the exception, in an attack of acute articular rheumatism of any severity and involving more than one joint, not to have it complicated by endocarditis. Mild cases of rheumatism in which but a single joint is affected, and the disease never reaches, as it were, its normal development, are much more seldom complicated by endocarditis; but even in these cases its occurrence is not so rare as to make it worthy of note. There are, of course, those who claim that endocarditis does not complicate rheumatism so frequently as I have stated, but they are growing fewer as our knowledge of the condition grows better.

On the other hand, it is pretty generally conceded that most of

the valvular lesions that are seen are the direct result of rheumatic endocarditis. Any of the infectious fevers, however mild they may be supposed to be, can be followed by endocarditis; but even the infection that after rheumatism causes the most endocarditis, namely, scarlet fever, is only complicated by the cardiac affection in something less than ten per cent. of the cases. This is the day of preventive medicine *par excellence*, so that the first and most necessary thing for a heart specialist to know would seem to be the best therapeutic means to prevent, if possible, the development of endocarditis in cases of acute rheumatism, or, at least, to modify its effects upon the heart so as to leave that organ as little damaged as possible.

It was Talleyrand, I believe, who said that language was intended to conceal our thoughts. Certainly many words were invented to conceal our ignorance, or at least they serve that purpose very well. Of these none more strikingly fulfils that function for medical men than the word rheumatism. There was a time when it had a very definite meaning. Every affection characterized by fever and joint swellings that did not go on to suppuration was rheumatism. The main symptoms of the disease, its differential diagnostic signs, were the classic symptoms of inflammation as given by Galen, the tumor, rubor, calor, et dolor of the joints. Gradually has come the separation from this comprehensive symptom complex of various sub-orders of disease, and the realization that joint affections accompanied by fever by no means fulfil the old idea conveyed by the word rheumatism, or constitute a disease by themselves.

When, formerly, joint symptoms developed in the course of scarlet fever, it was considered that a second distinct disease—rheumatism—had succeeded in gaining a foothold in the organism and was complicating the case. When endocarditis developed in the course of a scarlet fever case with arthritic symptoms, as it did not infrequently, this was looked upon as another proof of the rheumatic origin of the complication and of the coexistence of the two diseases. Certain affections, as scarlet fever and gonorrhœa, came to be looked upon as especially predisposing to rheumatism. The rheumatism itself was considered as due to cold, that ready scapegoat for the etiologist who cares only to have a word to cloak his ignorance half decently, and keep his neighbors from knowing that he does not know it all. Finally, however, came the realization that practically any infectious disease could be complicated by an arthritis which was

due not to an extraneous cause, but to the same cause as the primary disease, and that even so mild an infectious fever as chicken-pox or mumps could in certain epidemics produce a good many cases with arthritic complications.

Since the general recognition of this fact that arthritis was by no means always due to a single specific cause, the idea has been gaining ground that rheumatism as we know it, and apart from all complications, may be due, under varying circumstances, to a variety of micro-organisms. There are probably a number of bacterial forms that are capable of setting up the symptoms of arthritis besides the specific causes of the infectious diseases. Under the name rheumatism we have grouped, very probably, as many diseases as are included under the term cold. A number of micro-organisms have been described as occurring in rheumatic joints, and it is possible that all of them are the causes of rheumatic symptoms under special conditions.

Professor Leyden, of Berlin, is of the opinion that the specific microbic cause of rheumatism is a diplococcus which has been studied in his clinic. Professor Senator, also of Berlin, to whom in a way we owe the treatment of rheumatism by the salicylates,—since it was in his clinic that they were first used in sufficient amounts to demonstrate their great usefulness,—thinks that the microbe of rheumatism is a degenerate streptococcus. In a discussion before the German Society for Internal Medicine at Berlin, two years ago, Singer, of Vienna, demonstrated a bacillus that he thought specific for rheumatism. The claims of at least one other type of micro-organism was urged, while Chvostek, of Vienna, one of those formally invited to discuss the subject, did not think that there was any single microbic cause for the disease.

It is not much wonder, then, that, knowing as little as we do about the etiology of rheumatism, our treatment of it should be rather indefinite and tentative, distinctly in an experimental stage. With regard to the heart complications, our therapeutic ineffectiveness does not seem so striking when we consider that practically all of the pyogenic micro-organisms, including the diplococcus pneumoniæ, have been found in the vegetations of the heart-valves of patients who died from the disease or succumbed to some intercurrent affection.

The medical history of the treatment of rheumatism during the

present century, besides being interesting, is a suggestive chapter in the history of therapeutics generally and the rise and fall of remedies. About the end of the last century, Corrigan, the distinguished Irish physician whose name is attached to so many things in cardiology, said, in answer to the question, What is the best thing for rheumatism? six weeks! The experienced old practitioner had noted that rheumatism is a self-limited disease, and that, while it did not always last six weeks, under any treatment it took about that length of time for the average case to get better.

As is true of all self-limited diseases, rheumatism has very naturally had a number of remedies proposed for it, which, in the hands of their discoverers at least, and of those near them, have usually given good results. As a number of cases of rheumatism are self-limited long before the expiration of six weeks, and as at certain times most of the cases seem to be of the milder form that terminate naturally in from one to two weeks, it is not hard to understand how even careful therapeutists thought they saw good grounds for recommending certain remedies or special methods of treatment. There have been a good many other affections besides rheumatism for which this has been true. Erysipelas is a good example, self-limited usually in five to six days. Most of the pharmacopœial remedies, to say nothing of a host of popular methods of treatment, have been applied to it with asserted success.

The two best known remedies for rheumatism during the early part of the century were the alkalies and lemon juice. As to lemon juice, medical opinion is definitely made up. Directly, it is of no therapeutic service, though indirectly, by causing the consumption of considerable amounts of liquid, it may lead to the dilution of toxic substances in the blood, and to their more rapid elimination when they are soluble by the increase of blood-pressure occasioned and the consequent freer diuresis.

As to the therapeutic effect of alkalies, there is some difference of medical opinion. Old practitioners generally cling to them still in conjunction with the newer remedies. In European clinics, at the Charité in Berlin, for instance, they are spoken of as indifferent remedies, to be used when other remedies had failed. Just what is meant by the word indifferent in this connection, I am not sure; but it seems to mean that the alkali treatment should be employed as a sort of placebo during the tedious waiting for the natural ter-

mination of the disease, when all the ordinary rheumatic remedies had proved of no service. When the old ideas as to the pathogenesis of rheumatism prevailed, it was easy to understand why the alkalies were given so confidently. Rheumatism was due to an accumulation of uric acid in the blood, and this the alkalies helped to neutralize. Later, it was lactic acid in too large quantities that was in the blood, and I believe that many practitioners still cling to this notion of some form of acidæmia being at the root of all rheumatic manifestations.

Of every new method of treatment for rheumatism introduced, it was invariably said that it lessened the tendency to heart complications; that it not only lessened the actual number of cases of rheumatic endocarditis and pericarditis that occurred, but especially that it modified the seriousness of the heart lesions that developed in the cases in which cardiac complications did occur. Statistics have not been found to substantiate this claim for any method of treatment. For a long time this advantage was claimed for the treatment by means of alkalies, but it is not supported by any except a few of the older men at present. There would seem to be good reasons for saying that the only method of treatment that could lessen the heart lesions in number would be some successful prophylactic for the rheumatism itself.

For the endocarditis of rheumatism is scarcely a complication properly so called. It is in very truth of the essence of the disease just as much as the joint affections are, for the interior and exterior linings of the heart react to the rheumatic virus just as the synovial membranes of the joints do. It seems almost certain that the cardiac serosa are liable to be affected quite as early as any of the joints, and that very often they are affected at the very beginning of the disease. Just as some of the joints, as a rule, however, escape infection during a rheumatic attack, so the linings of the heart are spared in some cases. It seems clear, on the other hand, that the endocardium or pericardium are the only structures attacked in certain cases, and that the rheumatism runs its course and leaves a heart lesion without having seriously affected a single joint. It is probable that most of the cases of so-called simple pericarditis are really of this character.

We can hope, then, to accomplish about as much in preventing heart complications in rheumatism as we can in preventing the inva-

sion of other joints besides those originally involved. We can, however, hope to lessen the severity of the heart affection by appropriate means. For inflammation, the first indication is always rest. This we can obtain for the heart only relatively, but much can be gained by careful attention to details. There is ordinarily between the rate of the heart of a person lying down and that of one moving around, even quietly, a difference of at least ten beats; this, with the pulse at seventy, means a lessening of the heart's actual work by one-seventh. When the pulse is higher than normal because of fever, then the difference between the pulse-rate of the resting and that of the moving individual is much more. All rheumatism cases, then, must be kept absolutely in bed for the sake of the saving of heart exertion that it entails, and must be kept as absolutely quiet as is possible.

Under the mistaken reasoning that, because the heart was liable to be affected, therefore stimulation was indicated, stimulants of various kinds, especially alcoholic, have sometimes been recommended. This is practically always a serious error. Weakness there is, as a rule, very little, and to whip up an organ already laboring from disease is a sad mistake. There are certain cases of rheumatism in which alcoholic and other stimulants are indicated. They are the cases in which the heart-muscle itself is affected; for, besides rheumatic endocarditis and pericarditis, there is, as Leyden has especially called attention to, a rheumatic myocarditis. It is characterized by a weak, soft, though rapid pulse; by weak distant heart sounds, and a feeble apex-beat. The heart sounds are not muffled as in pericarditis, but clear, though weak and distant, and the apex-beat can be made out, especially when the patient bends forward, though perhaps with difficulty. The greatly increased area of dulness with its special form, and its tendency to change of outline on moving the patient, so usual in pericarditis, are of course absent.

In these cases of rheumatic myocarditis the heart action is, as might very well be expected, apt to be extremely weak. This leads to circulatory disturbance and to consequent malnutrition of all tissues, especially of the important nerve-centres. Trophic influences are seriously interfered with, and all organic function becomes impaired as a consequence. The heat centre is affected and hyperpyrexia may develop, though this is more usually the consequence

of the direct involvement of the serous membranes of the central nervous system in the rheumatic process. With so many dangers threatening, the circulation must be kept up at all hazards, so that, despite the danger of stimulating a heart that is itself affected, and should therefore be given all the rest possible, the indication is for heart stimulants. This constitutes the only reason, however, for the employment of alcoholic stimulants, and the abuse of them that is so common in rheumatism must work untold harm.

Practically, all the treatment of a case of rheumatism should be conducted with this principal idea as the guiding point,—that the one thing most necessary is to prevent disturbance of the heart's action. There is nothing else in rheumatism that deserves any attention as compared with this. Now there are certain factors essential to the disease that are prone to react upon the heart. The fever, with the consequent acceleration of pulse-rate that it determines and the restlessness that it induces, is the most important of these. The pain with its reflex action upon the heart, a reflex action that may cause syncope from defective cerebral circulation, when pains are sudden and severe, as, for instance, after rough handling or forced movement, is another and almost as important a disturber of the heart's action.

All treatment has always been conducted with the main idea of lessening these symptoms, since they are the annoying features of the disease. If they would be treated rationally, and without any futile seeking for any supposed specific medication, the results would be more encouraging than they are. Fever must be kept down, not so much because temperatures as high as we have them usually in rheumatism are very harmful in themselves, but because the pulse-rate and the heart's work increase in proportion to the fever, and because the fever induces restlessness, and this further disturbs the heart action, besides causing the introduction into the circulation of infectious material from inflamed joint surfaces during the movements. To allay the fever, experience seems to have shown that the salicylates are the best form of antipyretic; that is, the one least likely to be followed by unwished-for effects. It is to be remembered that the salicylates are not a specific, much as may have been said on that subject. They do not act as antiseptics, for, if that were the case, salicylic acid would be a much more powerful antirheumatic than any of its salts, since it is the best germicide among the salicylates; yet it is not, and

the salicylate of sodium in equal doses is at least as effective as the acid. They act simply as antipyretic analgesics.

They have broken away entirely of late in Germany from all idea of a specific effect in rheumatism from the salicylates, and have begun to use simple antipyretics under any form that seems best suited to the case. At the large Charité Hospital in Berlin the routine treatment for rheumatism in two of the three clinics is antipyrine. It is given in doses of from three to five grammes (forty-five to eighty grains) for the first twenty-four hours, and as much more the second twenty-four hours if the fever and pains have not subsided. Usually, at the end of forty-eight hours the patient is resting quietly, and then only from one to two grammes (fifteen to thirty grains) are given per day until the attack seems over.

The heads of these clinics are Professors von Leyden and Gerhardt, two very conservative and practical clinicians. Both of them are well known as heart specialists, and both assert that the antipyrine treatment is the most satisfactory they know. They consider that the rapidity of its action and the immediate amelioration of pain and fever it causes do much to lessen the danger of heart complications, and to diminish the pathological changes that may take place in a heart that is affected. Where the antipyrine does not produce the expected effect within forty-eight hours, or where idiosyncrasy for the drug prevents its use, another of the coal-tar series, usually phenacetine, is administered. Then in obstinate cases the salicylates, or some of the newer synthetic products, as lactophenine, salophen, or salipyrine.

Antipyrine has been tried a good deal for rheumatism, and has not always given as good satisfaction as at Berlin. Its use has, however, put the present treatment for rheumatism on its proper basis, that of antipyretic analgesia. In this country considerable prejudice exists against antipyrine, while the salicylates are the accepted remedy for rheumatism. Where the salicylates fail to act, however, it should be borne in mind that other coal-tar products may be effective, and after the second day in such cases they should be given a trial. Often not enough of the salicylates is given to produce the desired effect. Of sodium salicylate or of its equivalent salts, fifteen to twenty grains should be given at least every two to three hours, until the patient is under its effect and relief has come. This may require as much as two or three drachms during the first twenty-four

hours. Eichhorst recommends one gramme, fifteen grains, of either salicylic acid or sodium salicylate every hour, until ringing in the ears sets in.

It is to be remembered that salicylic acid itself, and also, though in lesser degree, the salicylates, are irritants to the kidneys. If, then, it is known beforehand that the patient has nephritis, or if there are casts as well as albumen in the urine,—for there will be, anyhow, a febrile albuminuria present,—some other antipyretic drug will be more advisable than any of the salicylic compounds. If the salicylic preparations cause diarrhœa or nausea or a bad feeling of pressure over the stomach, they are also contraindicated.

During the hours that must elapse before relief from pain and fever comes, a number of things may be done for the patient's comfort that will keep him at rest, and prevent the pain from reflexly affecting his heart. The affected joints may be rubbed with salicylic ointment or be covered with wintergreen oil, of which ninety per cent. is methyl salicylate. Ice-bags applied to the affected joints not only deaden pain, but check the inflammatory process and inhibit effusion, thus offsetting increase of pain. Patients enjoy ice applications, as a rule, and at the Charité in Berlin can be seen to be most sedulous in keeping the ice-bags on the joints, and asking that they be refilled when the ice has melted. The bags must not be the ordinary large ice-bags, and must not be filled with ice so as to be weighty, or they will not be well borne. Besides their effect on pain and inflammation, ice applications are claimed by careful observers to hasten absorption, and so bring an end to the rheumatic process sooner than internal medication alone could effect it. When pain is very severe, a fly-blister over the joints will relieve it. Patients complain of the discomfort of the blister when it is first suggested, but ask for it of their own accord in subsequent attacks. In order to keep affected joints absolutely at rest, and so avoid the reflex effect of even slight movement, a moulded paste-board splint may be gently applied, and is of great service.

Where pain occurs in the precordium, an ice-bag makes the simplest and most effective treatment. If the pain is very severe, the application of two or three leeches will usually allay it. A fly-blister is very effective for severe precordial pain, and seems, besides, in cases of pericarditis to lessen the exudation of fluid into the pericardial sac, and later on to hasten its absorption. As to whether any

of the heart tonics are indicated is in dispute. Unless the heart is very rapid and irregular, the symptoms of the development of a heart complication are no indication for digitalis or drugs of that class. Meddlesome therapeutics may do serious harm. The soft systolic murmur that occurs so frequently during any fever must not be mistaken for a beginning rheumatic heart lesion.

For comfort, the patient should lie on a moderately firm mattress, preferably of hair, not of cotton and never of feathers. A number of moderately firm pillows should be provided, by means of which the patient's limbs may be supported without inconvenience in any position that may be desired. From the rheumatism itself and the sudatory effect of the antipyretic drugs, there will be a great deal of perspiration. The patient should be clothed in a woollen, not a cotton bed-gown, and a woollen blanket, not a cotton or linen sheet, should be placed under and over him. Owing to the profuse sweating, too, there is always considerable thirst. For this lemonade is the best drink, according to those who have had most experience. Ewald, for instance, of Berlin, after a study of this subject, feels sure that it modifies the course of the rheumatic affection. As to whether alkalescent drinks in large quantities should be given is a question.

The series of microbes that have been found on the heart-valves in rheumatism, mainly various forms of cocci, grow most luxuriantly on an alkaline medium. To make the blood alkaline, as was for so long claimed to be *the* therapeutic desideratum in the treatment of rheumatism, would be rather to encourage microbic growth and undo the inhibitory precautions against such growth which nature had taken by increasing systemic acidity. Of course, citric acid, like the other organic acids, is absorbed as an alkali, and acts as such, so that lemonade tends to restore alkalinity to the blood. It would seem, however, that this serves merely to benefit internal metabolism by preventing the exaggerated acid reaction in the blood that is apt to take place in acute rheumatism, but does not defeat the conservative purpose of the acid reaction as does the giving of alkalies directly in doses sufficient to change rapidly the reaction of the urine from acid to alkaline.

Other drinks, especially such nutrient fluids as milk, oatmeal water, or barley water may be given freely. The free perspiration develops craving thirst, and, as the increase of blood-pressure favors

diuresis, while the presence of copious liquid in the blood dilutes toxines present and hastens their elimination, the giving of liquids plentifully is indicated. It is to be remembered, however, that larger quantities of liquid than normal in the circulation make harder work for the heart. Especially is the heart liable to be injured if it is affected by some toxic agent at the time that it is called upon to move a larger circulation than normal. In Germany and Austria special attention has been given to the dilated state of the heart consequent upon the consumption of beer. The beer heart is a dilated organ whose pathological condition has developed as a result of the absorption of large amounts of liquid into the circulation at the same time with the alcoholic toxine, and the effect of both these factors upon the heart. During the time of acute fever, then, for the first two to three days, while enough liquid should be given to supply what is eliminated, pieces of ice should be provided to keep the mouth from being parched, and thus setting up a fictitious thirst.

Convalescence from rheumatism is almost more important than that of any of the infectious fevers. It is apt to be a time of serious damage to important structures unless the greatest care is taken. The possibility of serious harm resulting at this time is increased because the rheumatic process is usually very acute and is soon at an end. It does not produce that general weakness which after the ordinary infectious fevers makes it difficult for the patient to abuse his health. For days after the acute rheumatic process with its pain and discomfort are over, the inflammatory conditions in the joints and on the heart-valves are not completely resolved. During this precious time retrograde changes are taking place that will decide the ultimate condition of the endocardium. Rest is of the greatest importance at this time, yet patients are tempted to get out of bed, and are often allowed to do so just as soon as they are able. The best authorities on the subject are agreed that at least ten days to two weeks should be passed in bed after the acute symptoms have passed off. The latest writer on rheumatism, Professor Pribam, of Prague, says rheumatic convalescents should not be allowed to take up their usual occupations for from four to six weeks. This is a most important matter, quite as important in its way as the traditional ten to fourteen days for the puerperal. It is probable that many rheumatic heart lesions are made very much worse than they would otherwise have been by injudicious exertion during conva-

lescence. At the beginning of convalescence, the exudation on the heart-valves is yet in a plastic condition, and may readily be influenced for the worse at least, if not for the better. A realization of this, and the impression of it on patients recovering from rheumatism, is probably the best therapeutic suggestion there is for diminishing the severity of heart complications with rheumatism.

THE TREATMENT OF ACUTE CONJUNCTIVITIS.[1]

BY EDWARD JACKSON, A.M., M.D.,
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THERAPEUTIC skill is chiefly skill in refined diagnosis. It is ability to discriminate between conditions, largely similar, yet sufficiently distinct to require different lines of treatment. Distinctions must be made, not only between apparently similar conditions of diverse origin, but with regard to the exact stage of the process, and the modifications introduced by the individuality of the patient. This is especially true of the therapeutics of acute conjunctivitis; for idiosyncrasy appears in the reaction of the conjunctiva to irritants, and conjunctivitis includes a whole group of diseases, scarcely more closely related than the various eruptive fevers.

It is now established that under the term acute conjunctivitis have heretofore been included, along with the effects of over-use of the eyes, sunburn of the conjunctiva, irritation from dust, smoke, etc., at least five distinct infections; the recognized pathogenic organisms being the gonococcus, Koch-Weeks bacillus, the pneumococcus, the Klebs-Löffler bacillus, and the diplobacillus of Morax and Axenfeld. To consider under one head the treatment of what we must regard as different diseases is justified by the meagreness of the clinical picture yet formed of some of them, and the fact that since their recognition time has not yet elapsed for any complete differentiation of treatment.

Much has been written about the connection of *eye-strain* and conjunctivitis; and the sensation in tired eyes, referred to in childhood's legends of the "sand-man," is familiar to all. Still, both the subject and the need to keep it before the profession are illustrated by the following case:

Miss B., aged thirty-seven, a teacher, found her eyes getting sore

[1] Read before the Rocky Mountain Interstate Medical Association, July 25, 1899.

in August. She went to the professor of ophthalmology in one of our medical colleges and had them treated for conjunctivitis, and they were soon so nearly well that she was told they would need no more treatment. But in a week they were worse again, and she went to another professor of ophthalmology, who treated them for the recurring attacks, making applications from two or three times a week to once in two weeks, until she came to me in the following May. The trouble was less in cold weather; but the attacks continued to recur; the eyes continued to "smart and burn terribly;" and she spent "two or three hours walking the floor at night and getting the mucus out of them." The conjunctival surface of the lids was constantly red, with a gray film of thickened epithelium.

Both of these professors told the patient explicitly that use of her eyes would make no difference to the inflammation, although she had noticed that they were always worse after much use; and neither adviser had made any careful study of her refraction. She had been wearing for many years the following lenses:

R. —2.⊂—0.75 cyl. ax. 180°.
L. —1.50⊂—0.75 cyl. ax. 180°.

Under homatropine I found she required:

R. —3.⊂—0.50 cyl. ax. 180°.
L. —2.25⊂—1. cyl. ax. 180°.

With these each eye had vision equal to 4/3 partly, and, as she had full power of accommodation, I prescribed the full correction for constant use. She had no other treatment, and went on with her regular school-work. The eyes "felt rested" while under the mydriatic, and continued to improve steadily. "Getting well just as fast as they possibly can," she expressed it. After wearing the glasses about a month, she came in at the end of a week of the hardest eye-work with eyes quite well.

Eye-strain should be thought of in connection with every case of acute conjunctivitis. If it be a first attack, with indications of some other cause, such indications may be allowed to determine the treatment. But if the inflammation be recurrent, or without any other obvious cause, or the circumstances point towards eye-strain, the refraction should be carefully measured, usually under a mydriatic, and any eye-strain eliminated.

Conjunctivitis from Irritants.—Prolonged exposure to bright sunlight, and especially its reflection from water, sometimes causes an acute conjunctivitis, marked by redness and swelling of the exposed portion of the conjunctiva, and severe burning and smarting. It is best treated by dark glasses, cleansing the eye with boric acid solution six times a day, and instilling a perfectly bland olive oil or liquid petrolatum.

Acute conjunctivitis from exposure to dust, smoke, or irritating vapors calls for, first, a thorough washing of the conjunctiva with normal salt solution, or boric acid solution; and then occasional instillations of boric acid solution, and in severe cases a few applications of the liquid or soft petrolatum.

Infective Conjunctivitis.—In all cases of conjunctivitis in which infection is a factor, the maintenance of cleanliness by the removal of all discharges is the most important part of the treatment. The existence of the conjunctival discharge is due to the effort of the tissues to rid themselves of invading micro-organisms and their toxines. If the toxines serve the organisms that produce them, by helping to overcome the resistance of the tissues, the discharge remaining in the conjunctival sac may be almost as harmful as the organisms actually lodged in the conjunctival tissue. It certainly is a clinical fact of the highest importance, that cleanliness of the conjunctiva exerts the most beneficial influence in all forms of infective conjunctivitis.

The frequency with which the cleansing of the conjunctiva must be repeated will depend wholly on the tendency of the discharges to accumulate in the conjunctival sac. In some cases, as in phlyctenular conjunctivitis, the free flow of lachrymal secretion will carry everything away with it; so that no other flushing of the conjunctiva is needed, and the special measures for cleansing may be confined to the lids and lashes. I have seen almost the same thing occur in the early stages of gonorrhœal conjunctivitis, which later required the most frequent cleansing. In general, however, one must watch from day to day the rapidity with which discharge accumlates, and order the repetitions of the cleansing accordingly.

Cleansing Solutions.—In the cleansing of the conjunctiva, large masses may be entangled in absorbent cotton and so drawn away; but the chief reliance is to be placed on the mechanical effect of currents of water. The water is made more effective by adding certain

substances; but it is always the most important part of the application. Strongly irritant solutions must be avoided. Thus, mercuric chloride should not be used in stronger solution than 1 to 10,000 or 1 to 5000. The cyanide of mercury may be used 1 to 5000 to 1 to 2500, the biniodide of mercury in 1 to 20,000. Formaldehyde may be used in 1 to 5000 or 1 to 3000; but such solutions cause considerable smarting. Potassium permanganate solutions of 1 to 4000 to 1 to 2000 are proper. Protargol, or alum, may be used in solutions of one or two per cent. Boric acid should be used in two- or three-per-cent. solution, and is quite unirritating.

One of the very best solutions for this purpose is the normal salt solution, two-thirds or three-fourths of one per cent.—a teaspoonful to a pint. The great advantage of the salt solution in private practice is, that it is more certain to be used as a wash. Its cleansing properties are not likely to be ignored, and reliance placed on some healing power to be exerted when it is dropped on top of the discharge, as is very likely to be the case with solutions purchased at the drug store. Weak soap-suds, from pure non-irritant soap, are also likely to be used with intelligent appreciation of their cleansing function.

For the application of cleansing solutions to the eye, special instruments have been devised. But those which are intended to be introduced between the lids must be used with great caution, and are scarcely available outside of hospitals. Even with the greatest care, they cannot be safely introduced so frequently as the eyes may need cleansing. For general use, therefore, the best instrument is an ordinary rubber-bulb pipette, the bulb of which should hold at least a fluidounce. It is often difficult to get one having a bulb of this size; but one can take the ordinary pipette and apply to it the bulb of a soft rubber ear-syringe. With this a stream is to be projected with some little force against all parts of the conjunctiva, that can be exposed by everting the lids or opening and turning the eyes in different directions. The discharge is to be worked out of the deeper portions of the conjunctival sac by movements of the eyeball. Commonly, the pipette should not touch the lids; but when there is very great swelling it may be occasionally introduced beneath the upper lid at the outer canthus. If this is done, great care must be taken to guard against the infection of other eyes by use of the same pipette.

Specific Applications.—With regard to specific applications for the various forms of conjunctival infection our knowledge is still very

deficient. Silver nitrate is an active germicide; but it is probably even more useful by quickening cell proliferation, and stimulating the nutritive activity of the parts. The one-per-cent. solution is a good strength to use, except in purulent conjunctivitis with free discharge, for which it should be two to five per cent. It should be applied to the everted lids with a mop of absorbent cotton. The chemical pedantry of applying more of the silver solution than is needed, and then neutralizing the excess with sodium chloride, can well be omitted. In non-purulent, acute cases, two or three applications of silver nitrate at intervals of one or two days generally do all the good that this drug will do, although they may not complete the cure.

Within the last eighteen months an organic compound of silver, protargol, has claimed much attention as a substitute for silver nitrate. Without attempting to review the literature of the subject or give in detail my own experience with it, I may say that for purulent conjunctivitis I prefer protargol, in two- to five-per-cent. solution, used freely as a wash, and with ten- to twenty-per-cent. solutions for application once or twice a day. In bad cases, I still make occasional applications of strong solutions of silver nitrate. But my chief reliance in these cases is the thorough mechanical cleansing of the conjunctival sac at short intervals. There can be no question but that protargol is far less irritant than silver nitrate.

Zinc sulphate, long a favorite remedy for conjunctivitis, has fallen into comparative disuse of late years. For many cases of acute conjunctivitis it is in no way superior to boric acid, while its application causes quite severe smarting. But since the recognition of diplobacillus conjunctivitis by Morax and Axenfeld, it has been proved the especial remedy for this form of disease. The one- or two-per-cent. solution is to be instilled once or twice a day.

For *diphtheritic conjunctivitis* it seems clear that reliance is to be placed not on local treatment, but on the use of antitoxin. I have had no experience with this treatment, for diphtheritic conjunctivitis is a rare disease. But the published reports seem quite agreed as to the remarkable benefit it affords. In many cases it seems necessary to repeat the injection of the antitoxin within twenty-four hours.

For the forms of *pneumococcus conjunctivitis* and that due to the Koch-Weeks bacillus, no specific remedies have been put forward. They generally run a mild course, and are benefited by the

applications of silver nitrate. Their management should include proper precautions to prevent the spreading of the infection, since the epidemics of acute conjunctivitis thus far studied have been of these varieties.

For *phlyctenular conjunctivitis*, characterized by recurrences, hyperæmia of a part of the ocular conjunctiva, and excessive lachrymation, the important part of the treatment is that of the nasal disease which usually complicates it, and attention to the general health. In these directions we must look for permanent relief, although the local use of the ointment of yellow oxide of mercury is important. This drug is one of our most troublesome remedies, on account of the liability of having excessively irritant specimens furnished at generally reliable drug-stores, and the wide range of susceptibility to its action. The common prescription is for an ointment of one part to sixty of petrolatum, one-sixth the strength of the official ointment of the "United States Pharmacopœia." But the first applications must always be somewhat tentative. Sometimes it must be used still weaker, and sometimes even the official ten per cent. ointment may be employed.

But among the most important points to be urged regarding the treatment of acute conjuctivitis are:

THINGS THAT SHOULD NOT BE DONE.

First. A mydriatic should not be used for acute conjunctivitis. It is to be feared that in the domain of ocular inflammations too many physicians regard atropia as the Indians are said to have regarded "Leather-stocking's" rifle,—as able to bring down anything in sight. They have imitated the celebrated whist rule about leading trumps, thus: "When in doubt, prescribe atropia." It is sometimes proper to prescribe a mydriatic in case of acute conjunctivitis; but only for some complication, not for the conjunctivitis. I know that the practitioner who feels some doubt as to whether the case is one of conjunctivitis, or whether there is not some inflammation of the cornea or iris, may reason that the former will get well anyhow; and that if there is keratitis or iritis the atropine is indicated. But if one cannot decide exactly what is the condition present, he ought to bear in mind that it may be glaucoma, in which case the mydriatic might do serious permanent harm.

A mydriatic, used in sufficient dose to be at all beneficial, is too

powerful a drug to be resorted to except upon an exact diagnosis. Then, in conjunctivitis, its influence is more likely to be harmful than beneficial. In a few susceptible patients, instillations of the ordinary mydriatic solutions produce violent outbreaks of conjunctivitis, with great swelling of the lids. More frequently they distinctly aggravate a pre-existing conjunctival inflammation. They always produce dilatation of the pupil, blurring of vision, and a desire to shun the light; and even the enforced rest for the eyes that they may secure will not compensate for their unfavorable effects.

Second. Do not prescribe cocaine in these diseases. It has no curative power, and the period of temporary relief during the anæsthesia and contraction of the blood-vessels is followed by a period of increased vascularity and irritation. Cocaine may be used as a local anæsthetic in acute conjunctivitis, to lessen the pain of strong astringent applications; yet, even for this use, holocaine is to be preferred. But if cocaine is added to a collyrium to be used by the patient, the temporary relief afforded is likely to lead to the frequent repetition of the application until very serious damage is done. Twelve years ago[1] I reported a case in which sight was greatly damaged by opacity of the cornea under such treatment; and various other cases of harm from such a use of cocaine have been reported since. In some patients cocaine acts much like atropine, producing violent conjunctivitis.

Third. Do not poultice the eye. There may be cases of ocular disease in which it is proper to use a poultice, but it is not proper in acute conjunctivitis. Sometimes, when one does not adopt a certain line of treatment, he never gets an opportunity to study its effects and revise his judgment. But it is not so in this case. I have seen many eyes that have been poulticed for acute conjunctivitis; and every experience of the kind has left me more thoroughly satisfied that the eye was the worse for poulticing. It makes little difference what the poultice is composed of, scraped potato, raw oyster, bread and milk, flaxseed, corn mush, or tea-leaves are about equally harmful. The latter article has been used so frequently that the "tea-leaf eye" is a well-recognized pathologic entity. Its excessive rather passive hyperæmia, swollen lids, photophobia, and macerated appearance, are generally easily distinguished; and the prescribing of a placebo, with the proscribing of the poultice, is certain to bring about

[1] Transactions of the College of Physicians of Philadelphia, June, 1887.

prompt improvement. It would seem unnecessary to caution you against the poultice, were it not that the practice seems to have such firm hold with the laity as to indicate that it must still be advised by some doctors; and occasionally some one, speaking even as an ophthalmologist, recommends the poultice in such a general and indefinite way that the advice might be taken as applying to acute conjunctivitis.

Fourth. Do not bandage or use any sort of compress. The effect of the bandage of any kind is to some extent that of a poultice. The patient may regard a bandage as evidence of the surgeon's care and the seriousness of the case. It may be important to impress the patient with the idea that you are doing all that can be done for him; but you should find some way of doing that without making his eye worse. Even in traumatic conjunctivitis, where rest is most important, the danger of infection overshades all other dangers; and the bandage favors bacterial development so strongly that the culture test with it is recognized as the most searching practical test for pathogenic organisms in the conjunctiva.

For similar reasons the compress is to be avoided. Even the ice-compress, which is recommended by many authorities for gonorrhœal conjunctivitis, I would avoid. I have used it. I have watched its use by others who thought they saw great benefit from it. But I have not so interpreted the results. Even its enthusiastic advocates agree that it must be promptly discontinued when signs arise of corneal involvement; and corneal involvement is the thing to be dreaded in gonorrhœal conjunctivitis. The cases without corneal involvement will get well anyhow, and the use of the ice-compress does not tend to prevent it.

Summary.—The points that I would urge are: That acute conjunctivitis is not one but several diseases; the successful therapeutics of which rest on exact diagnosis.

That possible eye-strain should be considered in connection with every case not manifestly infective.

For all infective forms the most complete cleanliness of the conjunctival sac is the important measure.

Mydriatics or cocaine should not be prescribed for acute conjunctivitis.

To secure conjunctival cleanliness, all forms of poultice, bandage, and compress are to be avoided.

TREATMENT OF THE HEART IN CHRONIC INTERSTITIAL NEPHRITIS.

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The sequence of events occurring in the cardiovascular apparatus during the progress of chronic interstitial nephritis is recognized as constituting an integral part of the pathologic incidence of this form of Bright's disease. The changes taking place may be briefly summed up as sclerosis of the arterial system and hypertrophy of the heart, conditions which in the fulness of their development invariably result in heart-failure. The constancy of these circulatory accompaniments has been recognized since the days of Bright, who placed the percentage of occurrence at sixty-five. More recent estimates make a much higher showing,—Goodhart's post-mortem average being 89.6 per cent.; Ewald's, sixty-four per cent.; Kanthack and Holmes, ninety per cent.; while Dickinson, Tirard, Balfour, and others regard it as certain that thickening of the arteries and hypertrophy of the left ventricle are invariably associated with cirrhotic kidneys. It is not too much to say that hypertrophy of the heart and arterial fibrosis accompany, in some degree, every interstitial nephritis of any standing, and are dominant factors in the clinical history. In brief detail, the cardiovascular sequence is as folows: As a result of the renal lesion and the resulting imperfect depuration of the blood, or because of conditions which coexist, although not necessarily the outcome of the renal changes, an abnormally high vascular tension becomes established, and may persist for years and progressively increase. This sooner or later brings about certain alterations in the walls of the arterioles, resulting in thickening, loss of elasticity, and increasing resistance to the onward passage of blood. This imposes an increased burden upon the left ventricle, which undergoes hypertrophy, to cope successfully with the high peripheral resistance. Thus compensation is established. Up to a certain point this hyper-

trophy of the heart may be said to be a "compensatory" or, at least, an "accommodation" enlargement, and it is to that extent fortuitous and desirable, and, so long as it compensates the renal lesion, its purposes are good. The evils of excessive hypertrophy may, as a rule, be successfully combated, but deficient or faulty compensation is fraught with serious consequences to the patient. Samuel West,[1] in the last Lettsomian lectures, remarks, "A persistently high tension under ordinary conditions is of itself mischievous, but not so with granular kidney, paradoxical as it may seem. The patient is best without granular kidney, but, if the kidneys be granular, it is better that the tension should be high rather than low, in other words, the patient is worse with low tension." The changes in the arteries are progressive, and the increased blood-pressure permanent. The hypertrophied muscular tissue is prone to degenerative changes, and shows a greater tendency to subsequent exhaustion and weakness than the normal heart tissues; so that it is but a question of time until increasing impairment of the nutrition of the myocardium with constantly growing peripheral resistance result in failure of compensation and dilatation of the hypertrophied ventricles. This nice adjustment to conditions that Nature brings about in the circulatory organs suffices, by its compensation of the renal lesion, to obviate the main danger of the nephritis,—the retention of the uræmic toxines. The debt which the kidneys owe the heart in this way is amply demonstrated when the cardiac compensation fails. Then the greatly diminished urine, increasing albuminuria, and rapidly developing uræmia leave us in no doubt as to what organ has conserved the life of the patient. Moreover, because of the friendly offices of the heart, we can obtain but little true idea of what the organic capacity of the kidneys really is; for what they are able to accomplish with the co-operation of a sustained blood-pressure, and what they are capable of when deprived of such assistance, are two widely different things. Kidneys which can well maintain their function under increased blood-pressure prove miserably inadequate when such support is removed. In a general way it may, in consequence, be stated that the condition of the heart is the best gauge of the disease. The clinical history of the vast majority of cases at their termination is that the excretion of urine was sufficiently good for the maintenance of life,

[1] Some Clinical Aspects of Granular Kidney, British Medical Journal, February 11, 18, and March 11, 1899.

and that the direct cause of death came elsewhere than from the kidneys,—usually from the heart.

Furbringer[1] is at some pains to point out that the heart does not simply compensate, but over-compensates the kidney lesion. This may be a necessity imposed by the peculiar character of the renal changes; but, however that may be, the cardiac condition is one of tense adjustment, which becomes progressively more susceptible to influence, more sensitive, more resentful to any increase in the circulatory load. During the early stages of the disease, the cardiac hypertrophy is not extreme enough to give rise to symptoms sufficiently pronounced to awaken even the notice of the patient. With the progress of the malady, evidences of embarrassment on the part of the heart become manifest, and giddiness, dyspnœa on exertion, cardiac discomfort, headache, and palpitation give to the clinical picture the "cardiac" aspect it seldom loses during subsequent progress. These symptoms are at first transitory, occurring at night-time or following unusual exertion. With the onward march of the disease, these signs of impaired circulation become more permanent and distinct, and during the last few weeks the dyspnœa is constant, and dropsy and uræmic symptoms supervene. At the same time, the pulse loses somewhat in tension and the heart sounds become less distinct and accentuated. The pulse, save in rare instances, may be said never to lose the element of tension, although this may become modified through failure of the muscular power of the heart.

In the treatment of chronic interstitial nephritis, if we are to draw any inference from the clinical history, we have decidedly to deal with more than one set of organs,—the kidneys. The damage wrought by the degenerative process in the kidneys is irremediable; and, in our endeavors to favorably influence the progress of the disease, we may with profit teach our art to follow Nature's lead and assist her in her heroic efforts at a conservative systemic compensation. Unaided, the preservative adjustment in the circulatory organs, which is Nature's compromise with the erring kidneys, is sufficient of itself to extend the course of the disease over many years, and with such perfect accommodation that it may be only through some untoward circumstance that the real condition of affairs is discovered. By contrast, the futility of our own endeavors when the

[1] Diseases of the Kidneys and Genito-Urinary Organs, vol. i. London, H. K. Lewis, 1895.

compensation has failed is apparent. The problem before us in the management of the disease will always include our utmost effort to conserve the damaged kidneys, and, if possible, stay the progress of the degenerative changes there, but it is no less incumbent upon us to maintain the *status quo* in the circulatory system. No greater mistake could be made than to approach the question of treatment solely from the stand-point of the kidneys, and leave the overburdened heart and arteries to shift for themselves under the exigencies of an impaired organic life. With the greatest care we must avoid all conditions which threaten the hypertrophied and sensitive heart fibres. We must employ all means to support the tone of the cardiac muscle and promote the equanimity of its nervous mechanism, and, when compensation fails, we must strive to restore, if possible, the damaged heart wall and re-establish previously existing conditions.

In my remarks upon treatment, I shall make no direct reference to the measures one should address towards the control of the renal condition, but will confine myself to the treatment of the heart and arteries. The conditions which confront us here are, as we have seen, thickened and inelastic arteries, which are constantly subjected to the strain of a heightened tension, and an hypertrophied and sensitive heart muscle. Thus the patient is exposed to the risk of rupture of the degenerated vessels on the one hand, and to failure of the hypertrophied heart on the other. As has been pointed out, both the increased tension and cardiac enlargement are compensatory and preservative, and on this account any effort to qualify either, unless taken with full understanding of conditions, may prove meddlesome and mischievous. At what point is one's intervention warranted? is the question. It is impossible to lay down any rule; but it would seem best to abstain from any active intervention so long as there are no definite subjective symptoms present. As soon as compensation passes in either direction the point of exact adjustment, there is no lack of evidence to publish it. An increase of tension in the arterial system beyond the bounds of safety becomes manifest in dizziness, ringing in the ears, headache, disturbed cardiac action, unusual fulness of vessels, occasionally epistaxis, or, it may be, temporary amblyopia. The first sign of a flagging heart is seen in the pulse, which loses some of its hardness and becomes irregular and frequent. Additional signs are dyspnœa, post-sternal weight, and

discomfort, cough on exertion or recumbency, and some diminution in the volume of urine.

In the early stages of the nephritis, if it be our good fortune to assume charge of the case at that amenable period, we should begin while compensation is still well maintained to take measures to insure permanence to the existing conditions. If the full co-operation of the patient can be secured, much may be done for his future health. With this end in view, it may be well to set the matter plainly before him and definitely state the necessities of his case, for it is often difficult to secure the faithful and permanent co-operation of the patient in so chronic a disease. As an assurance that no important detail of the patient's life escape, it is well to have him set forth minutely and in full a sample day of his life, his hours of work and sleep, his manner of occupation, his diet and habits. In this way a more thorough regulation of the small details of life, which are often important, may be secured. It is well to bear in mind that the directions to the patient are for his permanent adoption. We should, therefore, not risk misunderstanding, by lack of explicitness of direction or by trusting important details to the faulty memory of the patient. It is far more satisfactory to furnish him with full written particulars of the course to be pursued.

The details of life which will need especial care in regulating are the diet, clothing, exercise, and baths. Exercise is of more importance to the nephritic than, perhaps, to any other, because of the great need that exists to secure as good a nutritive condition as may be. Regular exercise in the open air should be recommended. This may consist of walks upon the level, perhaps golf upon a level course, or easy bicycle riding upon a smooth and level road. Strenuous forms of exercise, such as tennis and horse-back riding, should be interdicted; and the patient must be counselled never to hurry, run, or climb long flights of stairs, walk in the face of a strong wind, or attempt to mount steep acclivities, lift heavy weights, or strain at stool, and to be careful not to exert upon a full stomach. He should be warned to carefully guard against exhaustion and desist from all activity at the earliest approach of a continuous fatigue.

The clothing is a matter of much importance. These patients very easily take cold, in which case the kidneys and heart bear the brunt of the disturbance, and often to their permanent detriment. Moreover, the contact of a chill air upon the surface causes contrac-

tion of the cutaneous capillaries, thus raising arterial tension and increasing the work of the heart. The patient must be cased in woollen garments from head to foot, and sleep with flannel next the skin. In this manner, as Dickinson facetiously remarks, he may carry the temperature of summer under his waistcoat while breathing the air of winter, and so provide himself without leaving home with one of the advantages of travel.

The diet best suited to the control of the renal lesion is also best adapted for the heart. The cardio-vascular changes are Nature's responsive efforts to combat imperfect blood depuration. Consequently, the careful regulation of the diet according to the principles in vogue must form, especially in the earlier stages of the disease, the corner-stone of our treatment of the heart. The flatulence and auto-intoxication of indigestion are of all things the most disturbing to both the heart and kidneys. This is a development to which these patients are especially prone. The most scrupulous regularity of habit in regard to meals must be imposed, and the preparation of the food should of preference be by simple method. The patient must be cautioned against heavy meals and eating to satiety, and be instructed against fast eating and insufficient mastication of the food. The regularity of the bowels should be scrupulously maintained, and an occasional mild mercurial purge administered. Warning must be made against the immoderate use of tobacco, the use of alcoholics, sexual excess, and emotional disturbances, because of their disturbing effect upon the cardiac rhythm.

At the earliest signs of cardiac embarrassment some restriction in activity should be insisted upon, and when compensation seems threatened, or has already given way, absolute rest in bed must be enforced. It should be remembered, however, that, beneficial as rest may be to tide over a period of wavering compensation, prolonged bodily inaction is undeniable, and may work positive harm by impairing the nutrition, and thus hastening the degenerative changes at work in the cardiac walls. During the period of rest, massage and passive movements may do much to obviate these undesirable results. The greatest importance attaches to sustaining the mental tone of the patient, and regular sleep, which is one of the best of heart tonics, should be secured. To this end paraldehyde, trional, and sulphonal may all serve excellent purposes, and, when a simple reflex irritability seems to be the underlying cause, the bromides may suffice.

Chloral is frequently a dangerous cardiac depressant, and opium is bad for the kidneys.

The medicinal measures which we can bring to bear upon the heart during the existence of its compensation are limited to the vasodilators. The effect of these remedies is largely mechanical. They act by dilating the capillaries, lowering peripheral resistance, and thus diminishing the work of the heart. Moreover, by allowing a freer passage of blood through the vessels, the nutrition of the various tissues is improved. They are useful to overcome excess of tension in the arterial system, and are valuable aids in securing relief to an overburdened heart. To meet alarming symptoms and produce at once a decided effect upon blood-pressure, no measure is so useful as a free catharsis. In selecting a cathartic for this purpose, it is not a matter of indifference which one is chosen. Some preparation of mercury should be employed, for from it more decided benefit can be derived than from larger doses of other purgatives. The beneficial effect upon the tension of such a measure is well demonstrated in sphygmographic pulse-tracings taken before and after the action of the aperient. This effect may be continued and supplemented by repeated depletion from the bowels, or, better, by means of vasodilators. The vasodilators most useful in controlling arterial tension are the nitrites and the iodides. To meet emergencies the nitrite of amyl may be employed by inhalation, but its action is too ephemeral to admit of its continued use. For this purpose nitroglycerin is usually the drug of choice. It is well to bear in mind when prescribing the nitrites that those who have supernormal tension manifest a peculiar tolerance towards their action. Given in conventional doses they may prove disappointing. Nitroglycerin is very diffusible, and within a few (five) minutes its effects become apparent, while at the end of the three hours the arterial tension resumes its usual degree. A longer period than three hours should, therefore, not be allowed to elapse between doses, if a continuous effect is to be secured. The action of the iodides upon the vascular tension has been a subject of much dispute; some observers denying to them all effect and even condemning their use, while others enthusiastically praise them. Vierordt[1] expresses himself unqualifiedly in their favor, and reports undoubted good effects in the control of tension. He regards the *modus operandi* of the iodides as entirely

[1] Centralblatt für innere Medicin, June 26, 1897.

hypothetical; and, taking exception to Huchard and others who attribute to them direct action upon the heart and vasomotor nerves, he thinks it probable that the morbid process in the blood-vessels which otherwise always shows a progressive character is brought to a standstill, and that consequently the heightened blood-pressure is gradually lowered, which would provide for a decided amelioration of the circulatory function, although no retrogression of the vascular changes may be looked for. Judged from the effect upon the tension when administered for a considerable period, they may certainly be accounted a valuable means of relief to the overloaded circulation; and they may, as well, tend to restrain the hyperplasia in the kidneys. The most appropriate forms for administration are the iodide of sodium and iodide of potassium, in from five- to ten-grain doses, given well diluted one hour after meals. The proto-iodide of mercury seems occasionally to render very happy service in cases marked by a bilious habit with coated tongue and sluggish liver. It is undesirable to give a prolonged course of mercury in nephritis, so that the proto-iodide is best employed as an alternating substitute with one of the other iodides, and not continued for longer than two weeks at a time. One-sixth of a grain thrice daily is an appropriate quantity.

It is unnecessary to state that heart tonics of the digitalis group should never be used during the stage of cardiac hypertrophy. Digitalis and its congeners are only admissible when there is indication of failing compensation. In employing digitalis, its vasoconstrictor action must be borne in mind and provided against, or the peripheral resistance may be dangerously augmented. This is best accomplished by the simultaneous administration of a vasodilator. A good practice is to give the vasodilator about one hour after the digitalis. The latter is slowly absorbed, while the vasodilators are without exception quickly diffusible, and, by this arrangement of administration, the maximum effect of each falls together and control of tension is secured. It is a safe rule to follow, to always combine a nitrite or iodide with digitalis in interstitial nephritis, for some element of tension is never lacking. Strophanthus may be advantageously substituted for digitalis when the pulse tension is high. Its efficacy as a heart tonic is established, and it lacks the arterial action of digitalis. It must, however be used with caution in advanced degeneration of the myocardium. If digitalis and strophanthus fail to elicit response

from the failing heart, the outlook is grave indeed, and recourse to other measures holds out small prospect. Caffeine and theobromine may prove of value on occasion, and nux vomica and strychnine will always be of the utmost value as adjuvants to any plan of treatment.

In the employment of the measures referred to, it may be stated that digitalis and the heart tonics should in all cases be reserved for a failing heart, while the vasodilators may be employed throughout, first as conservators of the heart by modifying peripheral resistance, and afterwards as guards to the action of the heart tonics.

Time will not permit of more than a cursory reference to the applicability of the Schott gymnastic methods to the failing heart of Bright's disease, nor is my own experience in their use sufficient to enable me to dogmatize. The Schott gymnastic exercises comprise certain volitional muscular movements made against graduated resistance applied by the hand of the operator, and having for their object the stimulation of the circulation in the muscles brought into action, whereby the heart is reflexly induced to stronger and more abundant contractions, with a simultaneous relieving of the venous and acceleration of the arterial and lymphatic circulation. These movements are applied according to a definite plan, and with such attention to detail as to secure in an increased degree all the good effects of passive movements with little or no fatigue. To quote the words of R. Douglas Powell:[1] "The effect of the Schott exercises may be said to be a stimulation of the heart's action with some steadying effect and increased completion of systole, an improved circulation through the coronary arteries, and an increased mobility of the blood by its readier passage in greater bulk through the muscles, thus relieving stagnation in the great internal organs, especially on their venous side. . . . The effect on the general blood-pressure is that during the exercise itself the pressure first rises above the normal, but begins to fall even during the continuance of the exercise, so that at the end of the treatment it has usually reached the normal. After cessation the pressure continues to fall, and may become subnormal for half an hour or longer, when it slowly rises again to its initial height."

These exercises have been found of most excellent service in the failing heart of valvular compensation. By analogy, it would seem not unlikely that they might prove to be a valuable contribution

[1] British Medical Journal, vol. i., 1898, p. 933.

towards our means of sustaining the degenerated heart of granular kidney. At the outset, however, we are confronted by the fact that these movements are absolutely contraindicated in advanced arteriosclerosis characterized by hyperextension and degenerated vessels, and that they offer but slight prospect of success in cases with even moderate arterial change. In arteriosclerosis the increased energy of the heart's action caused by the muscular contractions is but inadequately offset by the coincident dilatation of the arteries, and hence a dangerous raising of the blood-pressure and strain upon the heart results. In place of an improvement of the cardiac insufficiency in such cases, the opposite effect is brought about. It is apparent at once that very few of the cases we are considering are eligible for this plan of treatment. Still, just as there are certain cases of arteriosclerosis of moderate grade in which the Schott exercises may with certain modifications be employed to advantage, so there may be an occasional nephritic heart capable of deriving benefit from mechanico-gymnastics. In considering the question of the proper selection of cases for mechanical treatment, no general rule can be laid down. Each must be judged upon its own merits and with the utmost care, for great damage may be inflicted in unsuitable cases. When the sclerosis of the arteries is not general and advanced and the superficial vessels not rigid, an attempt with resistance exercises may be made, beginning in an insinuating way with the gentlest movements and desisting upon the first sign of fatigue. No progression should be made to the more trying movements until a beneficial reaction is apparent from the easier exercises. If these fail to elicit results, it is needless to persist. In cases where the heart is so feeble that the primary rise of blood-pressure caused by even gentle exercises interferes with its action, continuance of the treatment can but result harmfully. It may be laid down as an absolute rule to be followed in these cases, that when there is so advanced a degree of degeneration of the myocardium that digitalis and other heart stimulants are without effect, no attempt with resistance exercises should be made. In patients whose muscular powers are greatly enfeebled the treatment is also forbidden. Dropsy may be taken as a contraindication, as may also persistent dyspnœa and engorgement of the right heart.

It is unnecessary to state that, in using a measure which in these cases is so largely tentative, every precaution should be employed to

secure safety and success. Not only should all the rules laid down by Schott and Besly Thorne be scrupulously obeyed, but the patient's condition must in all cases be looked to to furnish the individual indications so necessary to the success of any measure.

Although gymnastic exercises are but rarely permissible in the weak heart of interstitial nephritis, massage and passive movements are much more widely applicable. The experiments of Brunton and Tunnicliffe[1] go to show that the effect of massage and passive movements is to improve the circulation of lymph within the tissues, and to determine to the muscles a larger supply of blood, thus at once stimulating nutrition and affording mechanical relief to an overloaded heart. The employment of these measures is accompanied primarily by a slight and transient rise in blood-pressure, which is soon followed by a fall in tension less extreme and not so long sustained as that following resistance exercises. The effect, therefore, of these measures is the same in quality as the Schott movement, differing only in degree and duration, while the dangerous increase of blood-pressure is eliminated. They furnish valuable means of obviating the circulatory stagnation and malnutrition of prolonged and enforced rest. In fact, it is this last conservative function that is the principal office of all these mechanical measures in the cases under consideration. Too much must not be expected of them. The very nature of the factors which bring about dilatation of the hypertrophied heart of Bright's disease precludes the possibility of great or permanent results from any or every means we can bring to bear. Once dilatation has taken place, the outlook is, indeed, a dark one.

In concluding my remarks, I cannot do better than repeat the words of Leonard G. Guthrie,[2] who gives as a guiding principle in the treatment of chronic interstitial nephritis the motto, "Watch the heart and pulse." Herein I am convinced is the surest way to the successful management of this wide-spread disease. Sooner or later the morbid process must end in death. But this termination can be longest postponed, the patient's interests can be best served, his condition most securely palliated, by placing the heart upon a therapeutic parity with the kidneys.

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[1] Journal of Physiology, vol. xvii. p. 364.

[2] Chronic Interstitial Nephritis in Childhood, The Lancet, February 27, 1879.

TREATMENT OF TETANUS, CROUP, AND DEPRESSED FRACTURE OF THE SKULL.

BY JAMES F. RINEHART, M.D.,

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THE injuries incident to rural life are manifold and range in severity from the most trivial to those of the utmost gravity. A great many of them belong to the class of emergency cases, and demand immediate surgical interference. In order to be able to handle these cases more successfully, it is necessary for the physician to be familiar not only with the technique of the graver operations, but also to be thoroughly conversant with the modern methods of antisepsis. Some of the simpler injuries become very grave if not properly treated, as will be shown by one of the following cases.

CASE I.—This case is reported because it serves to show that simple injuries, as just stated, may, if the proper precautions are not taken, be followed by some one of the serious surgical disorders, and also because it serves to add clinical evidence to the statement made by bacteriologists that tetanus is at first a local infection, becoming general only as its toxine becomes absorbed and affects the nervous system through the blood, as any other systemic poison might do.

The case referred to is that of a young farmer who cut off the first phalanx of the forefinger, slantingly across the nail, at the juncture of its middle with its distal third. The accident occurred at his barn, where he was cutting corn on an ordinary cutting-box. The patient went immediately to his dwelling, a few yards away, washed and bound up his finger and returned to his work. Upon his return he found his missing piece of finger lying in the dust on the barn floor. Taking this back to his house, he cleansed it as thoroughly as possible, carefully adjusted it to its place, and securely fastened it there with sticking-plaster. The next day he came to my office to consult me about the case. While I was a little afraid he had not been thorough in his antiseptic precautions, still, I advised him to

let the piece remain in place, as an examination with an electric light showed me there was a good circulation of blood going on in the end of the finger. The examination was made by placing a small but strong battery lamp just back of the finger, the room being darkened. This method of examining the fingers and toes I have often used, and it serves to locate foreign bodies very nicely.

The case did well for several days, when the young man came to my house one night complaining very much of pains in his hand and arm, and with spasmodic contractions of the muscles of the forearm and arm, occurring at intervals of fifteen or twenty minutes.

Thinking that he might be simply frightened, and that the contractions might have been caused by simple nervous excitement, I induced him to lie down. He fell asleep, but I noticed that the contractions kept up, even to the degree of arousing him to restlessness.

My diagnosis was that of beginning tetanus. I unwrapped the finger and soaked off the sticking-plaster. The piece which had been cut off was firmly united, except a little place on the palmar aspect, which had festered. This was thoroughly cleansed with peroxide of hydrogen, soaked in a strong corrosive sublimate solution for thirty minutes, and dressed with iodoform damp.

The patient was put on the following prescription internally:

℞ Tinctura calabar bean, ʒii;
Potassium bromide, ʒiv;
Water, q. s. ad ʒiii. M.

A teaspoonful every four hours; and he was given one-quarter grain sulphate morphine every four hours.

Under this treatment the spasmodic attacks gradually grew less, and in a few days he was entirely well. You will find that most of the text-books give stiffness of the jaws as the first symptom to be observed in tetanus. My own clinical experience has been that general infection is usually preceded for a day or two by spasms affecting the muscles nearest the seat of injury. This is especially true in those cases in which the development and absorption of the poison has been slow, the infection being slight. One patient told me that for several days before he began to have stiffness of the jaws and general muscular contractions, there had been present a cramping of the hand and arm, giving him the sensation of having his hand pressed in a vise. This has been attributed by Brown-Séquard to an

ascending neuritis caused by the tetanus bacillus. It is while these initial symptoms are present that remedial agents are of most value in the cure of the disease, and careful inquiry should be made in all cases where there is a possibility of infection, in order that treatment may be begun before general intoxication occurs. Of course, there may be, and doubtless are, cases in which the toxine is so rapidly formed and absorbed that general nervous intoxication occurs before there has been time for ascending neuritis to develop. In such cases the general symptoms come first. It will be seen, then, that in the treatment of all cases in which there is a probability of infection with the tetnaus bacillus it is of supreme importance to use those antiseptics which have been found to be destructive to this particular germ.

Among the more important of these I believe to be the peroxide of hydrogen. I have often used it in infected wounds, and in dressing inflamed navels in young children where there might be danger of tetanus infection, for the reason that it has been proved by bacteriologists that the germ of tetanus is anaërobic,—*i.e.*, that it cannot live in the presence of oxygen. Abbott's experiments with the spores show that they are destroyed in two hours by a five-per-cent. solution of carbolic acid plus five-tenths of one per cent. of hydrochloric acid, and that a one to one-thousandth solution of corrosive sublimate, to which has been added the same amount of hydrochloric acid, will kill them in thirty minutes.

It would be well to soak such wounds in the latter solution for from thirty to sixty minutes before applying a dressing. It will be remembered that I spoke of applying iodoform damp. This should be done whenever there is no secretion from the wound, as iodoform exerts its antiseptic power only when moistened.

Case II.—This is a case of simple tracheotomy done for the relief of membranous croup. The croup began, as usual in such cases, with hoarseness and brassy cough, coming on at night, and getting somewhat better as morning came on. Towards evening the cough and hoarseness grew worse, but not enough so to alarm the family; and, as the child seemed somewhat relieved towards the next morning, it was not until the third night that I was called to see it. Herein lies the difficulty in treating a great many of these cases. The child is so often allowed to go on and on, under the idea that it has simple croup, until the case is thoroughly developed, that intubation be-

comes more dangerous to the patient than tracheotomy. You can readily see that this must be true after the membrane has become partially loosened and the trachea has become filled with phlegm. In the early stages of membranous croup intubation is best. This, with the injection of antitoxin and careful after-treatment, makes the treatment *par excellence* when the case is seen early; but where the membrane has softened and become partially loosened, as it usually does by the second or third day, the introduction of the tube will be found very dangerous for two reasons. First, the membrane is more

FIG. 1.

CASE II.—Showing tube *in situ* seven days after operation.

apt to be pushed down, occluding the windpipe, and, secondly, the secretions filling the trachea are apt to stop up the tube and necessitate its removal.

So, then, I would say that in the early stages only should intubation be attempted; and in the later period, where the membrane has had time to become softened, it is better to do a primary tracheotomy.

This rule has been learned by me from a rather sad experience. In one case I introduced the O'Dwyer tube, with the result that it had to be removed and the trachea opened. Cleansing the trachea

with pigeon feathers failed to elicit efforts at breathing, and repeatedly filling the little patient's lungs with my own breath through the tube did not restore him.

As to the method of performing tracheotomy, I will say that I am afraid the text-books have surrounded it with too complicated a technique. The directions are so elaborate, and its dangers have been so dwelt upon, that the ordinary physician is apt to consider it beyond his power to do. With ordinarily good judgment and with the exercise of proper care, the dangers of the operation *per se* are not very great.

It is always best in children to do the high operation. The cricoid cartilage can always be felt, and usually a ring or two of the trachea can be made out just below it. The child should be placed on a table of convenient height and in a good light, the head being thrown back over something which makes the neck easily accessible. A beer-bottle or the rolling-pin from the kitchen will answer. If the physician is right-handed, he should stand upon the right side of the patient; if left-handed, on the left. An incision three-quarters to one inch in length is made directly down on the windpipe, beginning a little above the lower border of the cricoid and extending downward. The only structures in this locality to be guarded against are a plexus of veins which spreads out over the front of the trachea and the occasional presence of the *thyroidea ima* artery, which springs, when present, from the arch of the aorta and runs directly up the trachea in the middle line. If the bleeding is venous, the best way to stop it is to open the windpipe and allow the patient to get two or three full inspirations. If the artery mentioned happens to be cut, it should be grasped with the forceps and the operation continued. Whenever the cricoid cartilage and one or two rings can be felt with the finger, the idea is simply to cut down on them, catch the cricoid with a tenaculum and open the windpipe just below it with the knife. If the neck is short and the windpipe inaccessible, it is permissible to cut through the cricoid. This I have done with no evil consequences. The idea is to relieve your patient as quickly and in as safe a manner as possible.

After the opening is made, there will be a sucking in of blood and a coughing out of phlegm, with possibly some shreds of membrane. If the condition of the patient is such that death seems imminent, the opening may be held open with the points of a pair of artery-

forceps until the lungs have been filled a few times with air. This helps to stop the bleeding, and thus facilitates the introduction of the tube. If the respiration ceases, as is sometimes the case, the tube should be introduced at once, and a feather thrust through it and any obstructing membrane or phlegm removed. This will often excite respiration. If it does not, then artificial respiration should be tried. If this fails, there is nothing left except to put your mouth to the tube and fill the child's lungs with air. This is said to be, and I suppose is, attended with some risk, and so may be used by you or not as you wish. I have done it in four cases, however, with no evil result. The mouth should be rinsed with some good antiseptic solution, and the mouth washed and the throat gargled with whiskey, if this method of restoring respiration is used.

The introduction of the tube is greatly simplified by turning it half-way around so that the end enters the cut in the windpipe in the fashion of a wedge. The tube can then be turned to its proper position and gently pushed to its place. This is a simple thing, but should be borne in mind, as it very greatly lessens the difficulty of its introduction.

In all cases the diphtheria antitoxin is indicated. I believe the vast majority of these cases to be caused by the bacillus of diphtheria. Indeed, I have seen cases of membranous croup get well with the early administration of the diphtheria antitoxin alone, large pieces of membrane being thrown off. One of the great dangers heretofore has been the systemic poisoning which has occurred, the patient dying more from this than from the operation or its effects. This danger can almost completely be eliminated by the injection of proper amounts of antitoxin, so that the case becomes one of simple tracheotomy, and is not a tracheotomy plus a septic intoxication.

The after-treatment of tracheotomy cases consists in keeping the patient warm and in keeping the air inhaled moist and at as nearly body heat as possible. This is best done by keeping a warm wet sponge constantly applied to the mouth of the tube. The air in passing through this is heated and moistened much as it would be in passing through the nose. The inner tube should be removed as often as need be and cleansed. If there is much secretion, which is usually a very favorable sign, the patient may be made to cough it up by allowing a few drops of warm lime-water to trickle into the windpipe through the tube. This helps to liquefy the phlegm as

well as to excite cough. The diet should, of course, be liquid, and such hygienic means should be employed as are needed to insure the patient's comfort and well-being.

The case here shown is at the seventh day after operation. The tube was removed the next day and recovery was soon complete.

CASE III.—You see here some fragments of bone which were removed from the skull of a young colored man. He was found unconscious, with a small cut just above the right ear. The scalp was shaved, the wound enlarged, and an examination was made with the finger. Seeing that there was a depressed fracture, the skull was

FIG. 2.

CASE III.—Photograph showing exact size of bone-fragments removed.

exposed by making two lateral and one vertical incision, beginning, of course, in the wound and extending far enough to give plenty of room to work. The fragments were depressed in such a way that any effort to dislodge them produced further pressure, so that it became necessary to make an opening in the skull just above the depression. You will see the button in the accompanying cut. After this button was taken out, it was a very easy matter to insert one blade of a pair of forceps underneath the depressed portion of the bone and elevate it to its proper place. This was done; but in doing so it was found that there had been an entire separation of the depressed portion, so that it was necessary to completely remove it. An examination disclosed a acerated wound of the brain about one

inch long and about one-half an inch deep. From this was washed a considerable quantity of bruised brain tissue and clotted blood.

The exposed portion of the brain was washed in a 1–2000 bichloride of mercury solution, a piece of gauze was carefully spread over it, and the skin-flaps were coapted and fastened with sutures, leaving one corner of the gauze hanging out of the lower end of the posterior lateral incision. A dressing of iodoform, iodoform gauze, and cotton was then put on and a bandage applied. The next morning the patient was conscious, and told us that he had had an altercation with another negro, who, he supposed, had struck him. No fever developed in the case. At the end of forty-eight hours the gauze was removed, the wound washed off with a bichloride solution from without only, no irrigation being used beneath the skin-flaps, and dressed as before. The case made an uneventful and uninterrupted recovery.

Medicine.

MORBID PROCLIVITIES OR DIATHESES.

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In discussing this subject, I may appear to some, and especially my younger readers, to be raking among old bones, or attempting to disinter some old beliefs which have long been laid to rest, and ceased to enlist consideration. I am, indeed, old enough to have discovered that my predecessors in medicine "were not all fools," and that the present generation is not the only one on which the light of truth has been shed. The last half of this century, which is my own lifetime, has been prolific in the outcome of knowledge relating to all department of medical science, so much so, that had I to recommence my studies now little of the curriculum I completed would avail me to pass the examinations of to-day. This fact leads me to ask whether all was wrong then, and whether all is right now? I reply by stating that both are right. We must keep pace with time, or fall behind altogether; we must keep our minds open and in a receptive mood, but, most assuredly, while "proving (testing) all things," we have to "hold fast to that which is true." I therefore ask, Are we, while learning and applying the latest revelations of truth in relation to our art, taking due care that we are not losing other truthful revelations which have been made in other times to other men as able and as competent to make them as those of our day and generation?

In reply to this, I will venture to affirm that we are in great danger of losing sight of important facts and doctrines, while we perhaps overload our minds with the latest contributions and theories

which are in these days foisted upon us in nothing less than an overwhelming amount. It is unnecessary to say that three pints cannot be put into a quart pot, and that there is a limit to what the most capacious mind can assimilate. In this way, I much fear, are lost many of the priceless facts and parts of knowledge that have been handed down to us by wise men in the past, some of which may have been once impressed upon us by our teachers, but have since been forgotten or displaced, perhaps even derided as mediæval nonsense, by more modern authorities.

Proof of what I affirm is not far to seek. The modern medical curriculum is somewhat overloaded, and the best students find five years none too long a period in which to complete it. The mass of facts to be mastered in order to pass examinations is enormous, and vastly larger than that which was demanded a quarter of a century ago. To acquire all this the average student has to submit to laborious study, and requires, and now commonly receives, a large part of his instruction as tutorial or "spoon-food" pabulum. In former times the student had more time to reflect, and read, and to digest his knowledge. The result of our modern method is to develop practitioners who think too little for themselves, are devoid of sound principles of medicine, and who thus are readily captivated by the latest novelties emanating from any source, not seldom without a basis of any dependable authority. It is too often forgotten that "what is new is not necessarily true," and that it is not essential for progress to be rapid. Advance in medical science, or in any other branch of knowledge, does not, and need not, entail the forfeiture or neglect of previous solid acquirements or well-established principles. Many of us, however, in these days behave as if it did, and we are the worse and the poorer for our conduct. We are so fearful of being old-fashioned and not "up to date," that we rush after the new and discard the old, and in many cases render ourselves less effective at the bedside than we should be. In the whole realm of medicine perhaps nothing is more needed at the present time than a due sense of proportion and a general level-headedness, if I may employ the term, among the rank and file of our profession. Doubtless, much of this comes with increasing experience; but it might come sooner were general principles earlier implanted in our candidates, at a period when receptive impressibility is strong in the human mind.

"To prove all things" obviously takes time. We have to test by experience the teaching we receive from all sources of dependability, and not from other sources.

What we have to do is to acquire and utilize well-grounded experience, and to prove for ourselves the slowly acquired principles that have been laid down for us by generations of thoughtful and practical physicians. Here and there, the resistless progress of knowledge enables us to correct and improve upon these, now and then perhaps suddenly, but more often by a gradual process. The bearing of these introductory remarks will appear later on.

Morbid proclivity is a term not seldom to be met with. Its equivalent, which I also employ, diathesis, is more rarely in use in the present day. It was frequently mentioned in my student days, especially in Edinburgh, by Laycock, who accepted the doctrines of the Parisian school in regard to diathetic states, and, indeed, minutely elaborated and extended them.

Some who speak of a morbid proclivity hesitate to speak of a diathesis, conceiving the latter term to include a good deal more than they are prepared to admit, and to necessitate agreement with the various doctrines that have been associated with it. We are only concerned to discover and hold by what is true, and we shall presently see where the doctrines in question lead us. First, as to definition. By diathesis is signified an inherent quality of the tissues of the body whose peculiar trophic processes predispose the subject of it to certain maladies. Morbid predisposition or proclivity will serve equally well as a synonym for this condition, which is generated in fœtal life, and influences ever after the life history of the individual. It is not a morbid state in itself, but, according to its specific nature, it predisposes the subjects of it to a definite line of disorders in the course of life, owing, as M. Hallopeau well expresses it, "to a modification of their physiological type which somehow diminishes resistance of their organism to certain excitants or provocatives."

A diathetic state may be often latent, or late in manifesting itself. Histology tells nothing in respect of any peculiar structural changes in the intimate tissues. We have, therefore, to regard the condition as one of cellular potentiality, whose molecular and nutritive metabolisms are only made known to us by obvious departures from the normal, and especially under the provocation of the ex-

citants to which they are peculiarly sensitive. We have, then, to conceive of certain persons as predisposed, in virtue of inherent textural peculiarities, to diseases in a manner which does not apply to others not similarly impressed. It is easy to understand that if such a condition exists, it is capable of transmission from parent to child, just as likeness of features is passed on through generations.

Our conceptions of transmission in this respect are too much restricted to outward and obvious features. As Sir John Simon remarked, "If a Roman nose or other peculiarity of facial physiognomy be heritable, why not a likeness of liver or other organs;" and why not, I would add, a likeness of the trophic rhythm of the organism?

A true understanding of diathetic predisposition enables us to explain not only the prevalence of, but the immunity from, disorders in certain families, the result varying on similar provocation, owing to tissue-proclivity on the one hand, or to tissue-resistance on the other.

A diathetic state thus lays its possessor open to a series of morbid conditions which may be diagnosticated and named as they occur. A recurrence of these, or an intense form of any one of them, may lead sooner or later to a state of cachexia which is the ultimate outcome of any unchecked or unmodified diathetic state. We find, next, that this condition may be transmitted in varying degrees of intensity; further, that it may be modified by other influences arising in ancestry, and also blended with a compound state by admixture, as it were, with another diathetic predisposition.

This doctrine of the diathesis has somehow never been quite acceptable, or dogmatically taught, in London within my knowledge. Questions relating to the constitution and temperament greatly interested the physicians of a century ago, and views not discordant with those just expressed were certainly taught at that time in most schools of medicine. The introduction of the microscope appears to me to have done much to banish this teaching. When men began to discover the intimate anatomy of the body, they imagined somehow that they had at last got behind the scenes of the stage of life, and that there were many fewer mysteries left for disclosure. Certain it is that the doctrine of the diatheses was discarded from that time, and by not a few teachers actually derided as mediæval and effete. Even in the Parisian school the same aversion from these

views occurred for a time, yet, strange to say, we owe the revival in better form of the doctrines to some of the best men of that school during the last thirty years.

To Bazin, Trousseau, N. G. de Mussy, Lancereaux, and Bouchard, medicine owes much for an interpretation of facts, plain and admirably suggestive to all who have true clinical acumen. Laycock, of Edinburgh, also did much to impress the doctrines of the diatheses, in the teeth of much opposition from the leading teachers of his time. As his pupil, I owe much of my interest in the matter to him, and have long had to confess the advantages I have derived from his conception and teaching.

It is right to state that confusion has arisen respecting the proper use of the term diathesis, some employing it to express an actual morbid state, apparent or latent; others regarding it, and correctly, as I believe, as a general predisposition only. The *diathesis* and the *disease* are not then to be confounded, as was done in the school of Montpellier.

We may next inquire how many separate diathetic states have been recognized. Here we find differences of opinion, but we are only concerned to arrive at the truth. Imagination is apt to lead us beyond the limits of the certain, and only a scientific use of that mental faculty can be really helpful in this, as in any other, problem. In England, and I think in America also, we sometimes credit our French colleagues with a surplus of the imaginative faculty; and it is true that some of these authorities have greatly elaborated the original doctrines, as did Laycock, and thereby failed to secure an intelligent assent to their views, or even to the bases on which they are founded.

At the present time, we have mainly to deal with two special diathetic states, the arthritic and the scrofulous. I shall not discuss others, because I am not in accord with the ideas which are expressed by them, and the two I have named have the support of the best authorities, and deserve recognition everywhere.

The arthritic diathesis is widely spread, especially among civilized races. This fact is not improbably connected with its origin and perpetuity. Individuals thus impressed are liable to suffer from a variety of ailments, some of which pertain to different epochs of life. In particular, they are sensitive to the infection of rheumatism, and present all or some of the varieties of that disorder, to wit,

the rheumatic disease of the skin (the erythemata, purpura, nodules); of the heart (endo-, myo-, and pericarditis); of the lungs and pleura, (rheumatism, pneumonia, and pleurisy), and of the brain (chorea). Osteo-arthritis in some of its varieties is also an outcome of this habit of body.

Congenital heart diseases are commonly the result of intra-uterine rheumatic endocarditis in the children of parents of this diathesis.

In early life there is a liability to hemicrania, which is apt to pass off towards middle life. Attacks of biliousness and dyspepsia may be frequent. There is a special sensitiveness to chills and damp environment. The disturbed metabolisms giving rise to lithiasis and oxaluria are often witnessed. Biliary calculi are especially apt to occur in later life, and obesity is very common in these subjects. Gout is often associated, with its varied manifestations; and glycosuria is met with either associated with or independently of the gouty tendency.

Ailments of this class distinctly run in families thus impressed, appearing at different epochs and in different generations; and it is surely a very important matter to recognize these facts. My experience distinctly confirms the above assertions, and they cannot safely be disregarded by those who profess and practise medicine. We are thus enabled to identify and mark off persons whose constitutions are thus modelled. The endeavor has been made, with some success, to recognize a definite external physiognomy attaching to such subjects. I will not attempt to define these features, but I have gathered facts relating to it for myself in my own experience. Such were well laid down by Laycock in his "Medical Observation and Research."

The scrofulous or strumous diathesis is equally well established, and its features are more commonly recognized, and have long been described, and acknowledged even by those who deny the doctrines of diathetic proclivity in general. We have the forms of "ugly" and "pretty" struma fully set forth in our text-books, and they depict actual states. The key-note of the condition is debility, poor nutritive power throughout the body, a sluggishness of reaction to injuries, with feeble recuperative power, and an over-sensitiveness of the lymphatic system in particular. The lymphatic area is thus the line of least resistance in such a constitution. The heredity of this condition is sufficiently obvious, and the circumstances which

evoke it are well understood. To my mind, nothing is clearer or more certain than this habit of body, and no less certain is its power for harmfully modifying, and rendering grave, the incidence of other morbid states which may assail the subject of it. We meet with its manifestations early in the life of children, especially in the form of glandular enlargements, starting from the lymph system of the fauces or the agminate follicles of the bowel. The bodily textures are a soil in which not only tubercle bacilli, but the germs of most noxious diseases can thrive and develop to the gravest degree. The influence of this innate proclivity is disastrous should parenchymatous nephritis occur. The subjects of it suffer in the tropics beyond others from dysentery and hepatic abscess, and indeed are ill fitted to bear any severe diseases. The relation of this scrofulous habit to tuberculosis has engaged much attention since Koch's discovery of the primary cause of tubercle, and now, with the customary self-satisfaction and experience which accompanies each new era of progress in medicine, there are not found few who boldly declare that there is not, and never has been, such a condition as scrofula, but that all that our predecessors have established concerning it merely indicates the *actual manifestations of bacillary invasion*. In other words, scrofula is to be abolished, and our idea of it is to be limited to specific infection of an indiscriminate soil. I must enter my strongest protest against such conceptions, and, accepting all the latest teaching of Koch and others, declare that I see no more in this matter than the alighting of tuberculous microbes upon a soil which is specially prone to invite and foster them, and which thereafter work their special mischief in various localities. The vulnerability of the tissues of the scrofulous is the peculiar feature of their diathesis.

We know now how persons of robust and normal nutritive type resist the invasion of irritants of all kinds. Their wholesome trophic rhythm is a protection against them, and they present no vulnerability. Surely it behooves us again to take note of facts like these in practical medicine. They not only explain many of the apparent anomalies of daily practice, but supply indications for dealing with them.

We meet with other inherited delicacies and tendencies which have not as yet been sufficiently formulated so as to be reckoned as special diatheses. Thus, the tendency to cancer in families has probably a significance to which we have, as yet, no clue. There are

persons whose line of weakest resistance lies, as in the strumous subject, in some special tissues of the body, as, for example, that of the arterial tree, possibly arising from some primeval defect in the organization of the fœtal *area vasculosa*. The blood, considered, as it ought to be, as an organ of the body, is conceivably prone to defects or faulty deflections from health which may arise in the course of life. The nervous features are obviously sites for the manifestation of innate trophic defects. But none of these conditions can be regarded as diathetic.

I come, finally, to ask whether there is not justification for the preliminary remarks made in this article? Are we in the presence of well-established facts and principles in the matter of these two diathetic predispositions, or are we dealing with mere fancies and absolute nonsense? Are these old conceptions of our great predecessors but fond imaginations, the best they could do with the materials and means then at their disposal; and are we wise and safe in now discarding these doctrines, and regarding ourselves in the light of to-day as so much more learned and capable than those whom we perhaps think were misguided men? I think these are matters to be "proved" by all of us; and I believe, further, that if we carefully test them, we shall do well to "hold fast" by them, for they are certainly among some of the "good" things in medicine. They should be taught systematically, and a full knowledge of them will not fail to bear rich fruit in practice, and greatly add to the interest of our daily work.

I have yet to refer to the blending or mixture of diathetic states. Through ancestral or parental influence we often meet with examples which indicate a conjunction of the arthritic and the strumous habits of body. This is readily intelligible, considering how widely spread these conditions are. A study of the compound state is pregnant with interest. I should have referred to the fact that strumous manifestations may appear late as well as early in life, tendency to outbreak having long been held in check by favorable conditions. We find that persons of the arthritic diathesis afford strong resistance to the invasion of the tubercle bacillus, and if infected by it are protected by their tissues and tissue-habit from the worst manifestations of tuberculosis. Thus a case of pulmonary phthisis in such a subject is likely either to be very chronic or to cease soon, owing to rapid fibroid changes which strangle and kill the

bacilli. The arthritic influence thus favorably modifies the strumous element in the case. The line of treatment which best overcomes the latter is that which is apt to provoke many of the disorders incident to the former, to wit, the good living (*duralimentation* of the French), flesh-feeding, and marine influences, all of which are commonly harmful to persons arthritically disposed. These two diatheses, then, are generally opposed to each other, but the arthritic may beneficially modify the strumous. Thus, I welcome an attack of gout in a person whose habit of body or ailments indicate a strumous tendency, and while I enjoin sea-air for the latter, I prescribe mountain or inland air for the former.

THE GENERAL ETIOLOGY OF ACTINOMYCOSIS.

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In discussing the general etiology of actinomycotic infection we have to take into consideration the possibility of infection from direct contagion with actinomycotic animals and their products and with human sufferers; the distribution of ray fungi in nature and the relation of actinomycosis to ray fungi present in the body under normal conditions, to wounds and to dental caries; and infection by means of grasses and other vegetable substances as well as certain biological peculiarities of the ray fungi.

The frequency of actinomycosis in cattle, the apparent ease with which infection of man could take place by contact, the fact that in France, for instance, the centres of human and bovine infection cover each other, are all circumstances which seemingly favor the hypothesis that the origin of many a human actinomycosis must be traced back to the beast.

There are, however, but few, if any, cases in which this mode of infection has been definitely established. It is to be remembered that in practically all such cases man and animal live under the same conditions, exposed to the same possibilities of infection.

R. Hartmann describes a case of facial actinomycosis in a man who had each day pressed an actinomycotic abscess on the jaw of a cow, in order to get the pus out. Oechsler, Häcker, and others also describe actinomycosis in individuals having under their care actinomycotic cattle. In a man who carried the lines around his neck while ploughing with oxen suffering from lumpy jaw, Lührs observed a small actinomycotic focus develop behind the sterno-cleido-mastoid muscle. Maydl describes actinomycosis of the tongue in a slaughter-house inspector, who had the habit of moistening his thumb upon the back of the tongue while at active work.

Enzoöties are described by Stienon and others, in which it is

possible that the discharges from sick animals, nearly always cattle, but sometimes sheep (Berestneff), may have infected the fodder of the animals later attacked, but probably the common fodder supply is originally at fault in such cases.

There seems to be but a minimum chance for infection of man with actinomyces by way of beef. In the first place, the organism is hardly ever encountered in the muscular tissue of cattle except in the tongue, and, in the second place, the vegetating threads as well as the spores are destroyed at a temperature far below that employed in preparing the meat for culinary purposes. There is no mention in the literature of any instance of infection from eating actinomycotic meat. All experiments in that direction have failed. It is probable that these general statements apply also to the possibility of infection from the consumption of pork, the seat of actinomycosis musculorum suis; but the facts are not so well established in this case because of the limited knowledge concerning this special actinomyces; if, indeed, the organism of this disease be a ray fungus. Mention must also be made of the possibility of infection through the milk of cows afflicted with actinomycosis of the udder, the possible dangers of which, in this aspect, are emphasized by Bang. Judging from the well-nigh uniform failure of inoculation experiments with actinomycotic material, from either the same or different species as the animal experimented upon, there is good reason to believe that the actinomycetes bovis are of such slight virulence that they cannot tolerate any change in the parasitic conditions to which they have adapted themselves, and that there is but an exceedingly small risk of man becoming infected by actinomycotic animals, either through contact or through food.

The only instance referred to as a possible example of infection by contact from man to man is the cases narrated by von Baraez, in which he assumes the possibility of transmission of atinomycosis by the act of kissing. A man with actinomycosis of the lower jaw became married, and soon the bride presented herself with the same disease. In this case, however, the husband and wife lived under the same conditions in which the husband received his infection.

There is no example recorded in literature of intra-uterine transmission of ray fungi or of congenital actinomycosis, and, according to Crookshank, there is absolutely no evidence of heredity ever playing any direct part in the causation of actinomycosis.

The actinomycetes are widely distributed fungi. They have been repeatedly isolated from the atmosphere, from water, from the soil, and from vegetable material, especially parts of grain, such as the chaff of rye, wheat, barley, and oats. It is, therefore, not strange that actinomycelial masses should be encountered in various parts of the body, under quite normal conditions, both in the case of man and animals. Thus, Johne, Korsak, and others found such masses very

Fig. 1.

Actinomycelial granules in crypt of normal human tonsil. (× 125.)

frequently in the tonsillar crypts of the hog, usually situated upon pieces of cereals. Ruge describes the occurrence of branchial mycelial masses in the human tonsils, and in a series of one hundred tonsils, examined in my laboratory for another purpose, characteristic actinomycelial granules without clubs were met with in four or five instances. Several Russian authors (Podbelsky, Dirichkoff, Platonoff) found actinomyces in the oral cavity; Waschevsky met with some form of actinomyces in the intestinal tract. It has been suggested that actinomycetes growing on mucous membranes may enter

gland ducts, the exit of which becomes closed up, while the fungus penetrates into the glandular acini, which rupture from distention, and thus allow the fungus to penetrate into the tissues (Wolkowitch and Chiari). The actinomycelial conglomerations rather frequently described in the lachrymal sac have been given the common name of actinomyces or streptothrix Försteri. Edington isolated his "bacillus of scarlet fever," which is an actinomyces, from the scales of the skin. Berestneff believes that under pathological conditions, such wounds and abrasions, actinomycetes, already present, may become pathogenic.[1]

Saur and Walentowiez describe bovine actinomycosis developing in abrasions of the skin, caused by rubbing; and Gooch narrates that after the insertion of the seton in twenty-one oxen in order to protect them from Rauschbrand, actinomycosis developed in a large proportion.

Carious teeth are commonly observed in patients with orocervical or maxillary actinomycosis; and James Israel, Partsch, and others were inclined to lay great stress upon the importance of this condition in the etiology of actinomycosis. Israel, Partsch, and others found actinomycelial granules in the pulp of more or less decayed teeth in cases of actinomycosis. Subsequent observations have not confirmed their contentions in this respect, further than that the pathological conditions of the gums in dental caries may favor the development of actinomycosis, which may, however, and frequently does, present itself in persons with perfectly normal teeth. Veterinarians have also made the observations that bovine actinomycosis not infrequently appears at the time of the second dentition, a fact which they are inclined to attribute to softness of the gums at this time and the ease with which it is injured by portions of the fodder.

The number of well-authenticated cases in which the actinomycotic process in different parts of the body has been found to be associated with foreign bodies of vegetable nature, more especially beards of barley and other cereals, is now considerable. Hummel collected twelve cases of actinomycosis apparently caused by foreign bodies; in four it concerned parts of barley; in one, of wheat; in six, non-specified plant remnants; and in one the infection probably resulted

[1] Mixter found two fish-bones in an actinomycotic swelling of the abdominal wall to which the intestine was adherent. Elliott found a fine-tooth comb in an abdominal abscess which he has little doubt was of actinomycotic nature.

from a flax-meal poultice. In Hummel's own case awns of oats were found. Since Boström's thorough investigation, the importance of vegetable fragments in the etiology of actinomycosis has been firmly established. These fragments can not only produce small lesions of the skin, or, more commonly, the mucous membrane, especially the oral, but they often carry into the tissue the organism,—the spores, or well-developed threads, or both, which are situated upon their surface or in their interior.

The evidences and observations in favor of this general statement may be presented under several headings:

1. A number of authors have found vegetable fragments beset by unknown forms of ray fungi lying in the tonsillar crypts of certain animals, especially the hog (Johne, Hoffmann, Korsak). Korsak quite frequently found beards of barley with mycelial masses in the tonsils of hogs, but he could not find actinomyces on the grain outside. He placed wheat chaff under the skin of a one-year-old calf; on removal after three or four weeks all were covered with actinomycelial masses, but there was no local actinomycosis. Further observations showed that in four days the fungus began to grow; after four months the masses were calcified. Experiments with rabbits were also negative. Careful examination of the pieces inserted into the heifer showed that the growth of the fungus first appeared at small openings in the cuticle and then spread out on the surface. Inserted into agar-agar, made with straw infusion, the chaff produced one actinomycelial colony, which became covered with the characteristic white powder.

2. The presence of vegetable fragments covered by ray fungi in the interior of actinomycotic foci. Boström found parts of straw, etc., very commonly in thirty-two cases of bovine actinomycosis of the jaw, even deeply in the interior of the foci, and also in six instances of disease of the tongue. He also encountered a barley-beard, penetrated by vegetating mycelium and spores, in an actinomycotic focus in a human ovary which stood in direct communication with the intestine by way of a fistulous passage. He then examined by means of serial sections such human material as presented itself, and was quite gratified to find that in every one of three cases subjected to systematic study fragments of vegetable nature, surrounded and infiltrated by actinomyces, were found, sometimes far away from the point of lodgement, and entry, being apparently in the act of

wandering through the tissues, after the manner of pins and other foreign bodies, distributing along their course new actinomycelial granules. The presence of small, oblique prickles or spines upon certain parts of cereals would favor the progressive migration of such fragments under the influence of muscular contraction and the gliding of tissues over each other, the obliquity of the prickles preventing backward movement.

Among some of the clinical observations in this line may be mentioned Soltmann's familiar case of the boy who swallowed a bit of barley beard, which lodged in the œsophagus and was followed by the development of a prevertebral actinomycosis which extended to the muscles of the back; on opening an abscess in the back the fragment was found in the pus.

Specific cases of actinomycosis developing closely upon the heels of the lodgement of similar fragments have been described by Sammter, Bertha, Lunow, Ransom, Jorinka, Fischer, Schartau, Hummel, Bonsdorff, Reboul, and others.

Both Boström and Jurinka, as well as others, lay stress upon the close relation between the awn, or bit of straw, and the fungus. The presence of the fungus within the hollow space of the awn, or straw, from which it grows out in a brush-like manner, would certainly tend to prove that the vegetable material carried the fungus into the tissues.

In the majority the seat of the disease was the tongue, pharynx, and œsophagus; in Reboul's case actinomycosis of the umbilicus developed in a harvest-hand; an actinomyces which grew on potato was found in the softened tissue, clustered around fragments of beards of wheat. Braatz describes an actinomycosis which developed in a bedsore over the sacrum of a woman who reposed for a long time upon a filthy and worn mattress of straw. Ammentorp, Illich, and Regnier found bits of straw in actinomycotic foci around the vermiform appendix, Bonsdorff in actinomycosis of the external auditory canal.

Bertha describes the case of a man who, while mowing oats, opened with his scythe a blister on the right hand at the root of the thumb; four weeks later actinomycosis developed at the site of the injury. In another case, described by the same author, a laborer, while thrashing, acquired a small nodule on the back of the right hand which in nine months looked like lupus, but was found to be

a rather superficial actinomycotic process with fistulous passages. Polosson's patient presented an actinomycotic focus which developed shortly after harvest-time and on the side where he carried his barley.

E. Müller reports the following interesting case: While scrubbing the floor, a twenty-eight-year-old woman received a splinter of wood at the root of the right middle finger on the inner surface. The splinter was immediately extracted; some swelling followed, but after eight days this had almost gone away; there remained a small nodule, however, until two years later, when the hand was again hurt, but without any visible lesion, when the nodule began to grow, and in two months an abscess had formed, which proved to be a cavity filled with actinomycotic granulations, enclosing a small bit of wood covered by actinomyces.

Bocarro states that mycetoma, or Madura foot, a distinct form of actinomycelial infection, originates in wounds, sores, and pricks of thorns, and that the points of the thorns of the Acacia Arabica have been found in the lesions.

Hochenegg, Brenner, and Tilanus all describe instances of actinomycosis developing in connection with the chewing of grain or straw; and Buzzi and Galli-Vallerio report the development of the disease at the site of the last molar tooth, where the patient used to scratch himself with the end of a straw on account of itching. Buzzi and Conti attribute the development of lung actinomycosis in a case, described by them, to the inhalation of dust in threshing of grain, soon after which the disease set in. Moosbrugger describes a similar case, and Birch-Hirschfeld found a bit of barley beard in an actinomycotic cavity of the lung.

Krantz and Tribout describe encapsulated actinomycotic foci in the tongue of African oxen, the central focus of which consisted of a piece of thorn or plant-hair surrounded by small actinomycelial granules. Kratz found a bit of straw in the very centre of an actinomycotic focus of the right lower jaw.

Walker accidentally found, in a rabbit's tongue, vegetable material, surrounded by colonies of masses of clubs radiating from several centres containing a few bacilli and cocci. Surrounding these masses were pus-cells succeeded by a zone of epithelial cells, and also several polynuclear giant-cells, all enclosed in a dense capsule of fibrous tissue containing groups of lymphoid cells.

3. The time of the year when actinomycosis begins. Boström

observed that in nine cases of oro-maxillary actinomycosis eight (or eighty-nine per cent.) began in the autumn months and one in April. Collecting one hundred and forty-nine cases from the literature, he found that in the reports of eighty-four the time of the beginning of the disease is stated: sixty, or seventy-seven per cent., began in the period between August and January inclusive, nineteen, or twenty-three per cent., between February and July inclusive. Naturally, these figures speak in favor of the *rôle* of the various grain- and fodder-producing grasses in the etiology of human actinomycosis; they emphasize especially the probable part played by the dust of cereals and hay.

4. The nature of the season and the kind of fodder as related to the development of actinomycosis in cattle. Veterinarians, such as Roger, Bang, Jensen, and others, are agreed that bovine actinomycosis develops less frequently after dry than after wet seasons. Bang and Jensen note the occurrence of actinomycosis in endemic form among cattle fed on fodder, raised upon reclaimed and, in part again, submerged land.[1]

Immiger lays stress upon the importance of dry and rough fodder in causing lumpy jaw, Preusse dwells especially upon the dangers of dusty and mouldy hay, such as often obtained after floods and in very wet seasons. Assuming it for granted that the actinomycetes may develop upon and in various grasses, the significance of the above observations lies in the circumstances that moist fodder furnishes the best medium for the organisms which find their nourishment in the plant juices, while the dry hay is more likely to cause injury to the mucous membranes, and such lesions would predispose to infection. Hay or cereals infected with actinomycetes would on drying give rise to a dust which might contain a great quantity of spores of the ray fungi, and under these and similar conditions epizoötics of actinomycosis may develop.

5. The occurrence of ray fungi upon grasses in nature and certain etiological peculiarities of ray fungi.

Reference has already been made to Korsak's experiments.

Liebmann states that on sowing actinomyces, obtained from a case of actinomycosis, in the same pot as wheat, he was able later to recover the same ray fungus from various parts of the growing plant.

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[1] Over one hundred cattle eating fodder from reclaimed soil were affected.

Gasperini obtained various actinomycetes from dry fodder, and twice he isolated the actinomyces albus, which is one of the varieties observed in the lesions of actinomycosis. Berestneff experienced no special trouble in isolating various kinds of ray fungi from straw and hay by placing small pieces in moist sterile sand; at certain places the stem would bulge and variously colored spots would appear, coalesce, and produce a mouldy odor; from these areas, in which higher moulds also at times appeared, pure cultures of ray fungi were then readily secured in the usual methods. Transverse sections of the bits of straw and hay showed, as Boström and Jurinka had already observed in the fragments of grasses found in the lesions, that the fungi develop in the parenchyma as well as upon the surface of the pieces used. Berestneff did not succeed in producing any progressive lesions by inoculating such pieces under the skin of guinea-pigs and rabbits.

Behla obtained vegetations of actinomyces upon bits of barley stubble which were inserted under the mucous membrane of the mouth of small pigs.

It may consequently be concluded that during the drying of cereals and of ordinary grass air spaces with external openings are formed in the awns and other parts in which spores in the air, or spores and threads of ray fungi already present upon their surface, may penetrate and, when favorable conditions arise, vegetate in the interior.

Dor, Berestneff, and others have shown that ray fungi grow more or less readily upon the sterile ears and chaff of various cereals. Bang found that actinomycetes could remain alive upon dry beards of grain for one year, and Dor observed that the spores of actinomyces grown on the ears and chaff of barley, wheat, and oats gave rise to new cultures after having been allowed to stand quietly in a corner of the laboratory for four years. One may, therefore, conclude, with Poncet and Bérard, that, as far as known, the spores are the lasting forms of the ray fungi capable of existing in the atmosphere and upon grasses and other objects in nature for a considerable length of time. There is consequently no incompatibility between the biological characteristics of the ray fungi and the important etiological *rôle* in the development of human and animal actinomycosis which the careful student of the facts and observations above set forth feels himself constrained to assign to various grasses, no matter what the portal of entry, whether the respiratory or digestive tract or the skin.

In view of the practically constant danger of infection to which herbivorous animals would seem to be exposed, it must be assumed that they are relatively but little predisposed to the action of the pathogenic ray fungi. Considering, on the other hand, the much smaller chance of infection which man runs, it would further appear that man is relatively more susceptible to actinomycosis than any animal we now know anything about in this respect. This also seems to be the view of Boström and Berestneff. Actinomycosis in man also assumes a progressive character more frequently than in animals.

At the same time, as parts of grasses, and possibly other vegetables, play an important part as vehicles of the infection of actinomycosis, they may also, it would seem, protect the organism in their interior from the action of the tissue juices and of the cells until the microphyte has become so modified as to assume the *rôle* of a pathogenic parasite. Such observations as the one cited from Müller show that the ray fungi may remain latent within the tissue for a long time. When the foreign body, loaded with actinomyces, begins its wanderings in the tissues, as described by Boström, Soltmann, and others, it is very interesting to observe the line of actinomycelial granules which it leaves in its wake, due, it would seem, to the constant dropping out of fragments of threads and of spores which have become adapted to parasitic conditions.

There are numerous facts that seem to indicate that the foreign body upon and in which the organisms are introduced into the body may protect the organism until it can adapt itself to parasitic conditions. Thus, actinomyces albus and albidofuscus, when obtained from the air, straw, etc., are usually non-pathogenic to animals, but in natural conditions they not infrequently are found in actinomycotic lesions. It has been suggested by Friedberger and Fröhner that the fungus of actinomycosis is pathogenic only in the stage of growth associated with grasses, but the development of metastases in a measure contradicts the truth of this theory.

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BRONCHIAL ASTHMA.[1]

CLINICAL LECTURE DELIVERED AT THE UNIVERSITY OF MARBURG, GERMANY.

BY FRIEDRICH MÜLLER, M.D.,

Professor of Special Pathology and Therapy and Director of the Polyclinic at the University.

GENTLEMEN,—The first patient I have to present to you this morning is, as you see, a man of rather small size and of slight, delicate build. He has none of the stockiness so characteristic of small men, but seems lacking in strength. His skin, you will notice, is slightly cyanotic. His breathing is audible even at a distance from his thorax, and you will notice, on inspection, that his expiration is distinctly lengthened. A little closer up, though, yet without the necessity for putting your ear to the chest, you can hear that the expiration is accompanied by creaky, whistling, musical sounds. It is evident that we have to do with some pulmonary affection. On inspection, we find that the thorax is very poorly developed, as if it were too small even for so small an individual. It is especially noticeable that the lower part of the thorax is drawn in and that the abdominal muscles are used for expiration. The lungs have evidently lost their power to make a complete expiration by the aid of their own elasticity alone. The accessory muscles of respiration must be called into play in order to complete the act.

Percussion shows that the inferior border of the lungs is much lower than usual. They reach in front down to the seventh intercostal space, and at the back down to the twelfth rib. The sound elicited on percussion is loud and somewhat tympanitic; it gives a percussion sound that is sometimes spoken of as "boxy." The heart dulness is very small, since the organ is covered by the emphysematous lungs.

Auscultation shows that the expiratory murmur is, if anything,

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[1] Reported by James J. Walsh, Ph.D., M.D.

slightly longer than the inspiratory murmur; while, of course, usually the inspiration can be heard much more clearly and is much longer than expiration. Over the whole of the lungs we hear high-pitched whistling and somewhat musical râles. Even without going any farther or asking the patient himself any questions, we could decide under the circumstances that we were in the presence of an asthmatic condition. This is especially so because of the persistent position of the thorax in full inspiration and the deep position of the lower border of the lungs. This last particularly is a pathognomonic symptom of asthma, as Bierner has pointed out. As a confirmation of the other symptoms, we have the peculiar high-pitched musical râles. We shall see that our "snap" diagnosis is confirmed by the history of the patient.

He is the youngest of his family, and was born at a time when his father's health had been broken down by addiction to drink. His brothers and sisters are healthy, while he himself was never strong, and even while at school suffered from difficulty in breathing, and could not run as much as other children of his age. It would not seem, however, that his respiratory trouble during his school-years was ever severe enough to be considered as genuine asthma. When he was eighteen years old he had his first attack of true asthma. It came on during the night. This attack left him so weak that he was unable to resume work, and after three weeks he came to the hospital. That was three years ago; since then he has had numerous relapses, and has had to come to the hospital for more or less prolonged stays several times a year. Of late, he has never been entirely free from shortness of breath, and the intervals between his attacks are gradually growing shorter, while the attacks themselves become severer. He dreads now to go to bed because of the fear of being waked up by an attack. The sense of oppression on his chest has become so great that he is tortured by an almost constant fear of death. In the house he persistently wishes to be at an open window. After his attacks he suffers a good deal from cough and considerable expectoration. Between attacks, however, his breathing is never entirely free any more, and on the slightest exertion, as the climbing of stairs or a slight ascent, difficulty of breathing develops.

We dare not draw the conclusion, however, that, as so often happens in asthmatic cases, our patient has developed a permanent emphysema. Conditions like this may persist for months, even for

a whole winter, and yet, under favoring conditions, completely disappear, the lungs returning to an absolutely normal condition. There are cases, however, in which none of the persistent dyspnœa of the present case occurs at all, and in which the asthmatic attacks develop suddenly in the midst of perfect health.

In every case of asthma it is necessary to examine the nose carefully. Very often nothing will be found the matter, but in certain cases some pathological condition will be found, the cure of which will lead to the disappearance of the asthmatic attacks. In our patient we have found that there is a deviation of the septum of the nose and a hypertrophic congestive condition of the lower turbinate bone. There is evidently present a pathological condition of the erectile tissue of this turbinate, which affects especially the posterior portions of the organ. Congestion due to disturbances in the vasomotor system may, under conditions such as are here presented, easily lead to such narrowing of the breathing passages through the nose as to seriously interfere with nasal respiration. It may even lead to complete occlusion of the nasal passages for the time being, at least, and necessitate mouth breathing. This may happen to patients who do not suffer from asthma, though they are apt to be subject to vasomotor disturbances. It may occur from the influence of sudden cold, from physical factors, as during crying. It is easy to understand that such an occlusion of the nose, which very naturally causes difficulty in breathing, may easily cause increasing dyspnœa and finally lead to an asthmatic attack.

Yet this apparent direct physical connection between nasal obstruction and asthma must not be taken to mean too much. There is a good deal of evidence that the pathological conditions in the nose may be a part of the changes that have taken place in the rest of the respiratory tract, especially the lungs, and not be the cause of them. Adolph Schmidt, at my suggestion, investigated this subject a short time ago, and he found that the nasal mucous membrane in asthmatic patients contained a large number of eosinophile leucocytes. These cells are also present in the bronchial secretions of people suffering from asthma. Charcot-Leyden crystals have been found in nasal polyps, and, as is well known, occur constantly in asthma. Besides this, in a certain number of cases an attack of asthma is accompanied by the sudden appearance of a copious discharge from the nose, the so-called hydrorrhœa nasalis. Finally, it is not unusual to

note that an attack of asthma begins with snuffles, and one obtains the impression that the process began in the nose and gradually found its way into the bronchi.

After the nose, it is mainly the sputum which is interesting in asthmatic cases. The expectoration of our patient, which you see here in this dish, is not unlike the white of an egg. It is a thick, transparent, mucous substance, existing in clumps here and there, which show no tendency to flow into one another. I can overturn the dish without its running out. It is easy to understand that masses so tenacious as these, especially when present in the air passages, can easily hinder breathing, since they narrow or even completely stop up the bronchi. The sputum of asthmatic patients, however, is not always so tenacious as this, and there are cases in which a much thinner fluid occurs. These used to be spoken of as pituitoses. The amount of expectoration varies extremely in different cases. It is mostly after the attack that the greatest amount of secretion occurs, and it is easy to understand that the difficulty of breathing becomes less when the tenacious secretion has been gotten rid of. There are cases, however, in which the expectoration after the attack is so little that it is very hard to connect it with the difficulty of breathing at all, and so we must look for other causes that narrow the bronchi.

If we look at the sputum in this dish more closely, though as yet only with the naked eye, we find a series of sago-like pellets of material of the size of a hemp-seed. When we place one of these under a microscope, we find in it, besides a few leucocytes and pulmonary epithelial cells, a large number of dully shimmering rounded masses and disk-like bodies, which often present a double continuous border and bears somewhat the figure of a snail shell or a spiral, reminding one of a figure six. Often they take on a biscuit or pear shape. They seem to be composed of a very tenacious material, which does not mingle with the mucous ground substance of the expectoration. These pellets are not unlike those which one obtains when nerve substance is crushed and then examined under the microscope. The figures obtained from crushed nervous tissue Virchow called myelin forms.

It was for a long time in doubt what these myelin forms in the sputum might mean, as they occurred very seldom in purulent sputum,—for instance, in tuberculosis,—but occurred very plentifully in the tenacious expectoration of chronic catarrh, of asthma, and

the like. It was finally concluded that they were a secretion of the goblet cells; that is to say, a special mucous material which was produced in these unicellular glands. Recently, Schmidt and myself have succeeded in showing that these myelin forms in the sputum do not give the reaction of mucin, but that, on the contrary, they are soluble in alcohol, and that from the alcoholic extract of such sputum a large amount of protagon could be obtained. Protagon is that peculiar nitrogenous material which contains phosphorus, and is not unlike lecithin in certain of its chemical characters, and is found so abundantly in nervous tissue. We are, therefore, in the presence of the fact that the bronchial mucous membrane is able to secrete a substance such as we usually look for only where we have nerve substance to deal with.

Besides these myelin forms, we have in the sputum, when looked at under the microscope, other definitely formed elements to consider. Besides the flat epithelial cells which occur in every catarrhal secretion and some cylindrical epithelium from the bronchi, we find quite a number of white blood-cells. These do not occur, as in purulent sputum, in thick masses together, but are scattered separately, here and there, through the mucous ground substance of the expectoration. This is a sign that we have not to do with a serious inflammation of the bronchial mucous membrane. When we examine these leucocytes closely, we find that the greater part of them are filled with granules that reflect light, almost as if they were composed of fat. Even the nucleus in the cell is not free from these granulations. It was formerly thought that there was a question here of genuine fattily degenerated white blood-cells. But more exact investigation by means of modern staining methods has convinced me that these granules are the same as those described in the eosinophiles of human blood by Ehrlich. These eosinophiles are present in the blood of healthy people in very small numbers; in the blood of asthma patients, however, they are present somewhat more abundantly, while we have them in comparatively large numbers in the asthmatic secretion.

The question arises, then, as to whether these eosinophile cells are wanderers from the blood,—in which case it must be supposed that the nasal mucous membrane had a certain specific chemotactic attraction for them,—or whether it is that the ordinary outwandering leucocytes become laden with eosinophile granulation in the mucous

membrane itself. Adolph Schmidt, who excised portions of the mucous membrane of the nose from such cases, is rather of the latter opinion. Whatever the explanation may be, there is a very large number of these eosinophiles always to be found in asthmatic sputum; and where they occur, the fact can be noted macroscopically by the occurrence of these small, yellowish tenacious masses.

These pellets of material, though they are only of the size of the head of a pin, present other organized elements that deserve study. Here especially do we find the two-pointed crystal, which Charcot first demonstrated in the blood of a patient who had died from leukæmia, and that later Leyden pointed out in asthmatic sputum. It is not impossible that these Charcot-Leyden crystals bear a certain relation to the eosinophile granulations, though at present we know nothing definite of their constitution.

The most important characteristic of asthmatic sputum is the occurrence of the spirals, which Kurschmann first pointed out. They are composed of threads of mucous wound up together. The larger forms of these so-called Kurschmann spirals can be seen macroscopically when we look at the sputum through a glass dish at a dark background. How these mucous fibrils become thus twisted has been the subject of a good deal of speculation. It would seem that the unusually tenacious mucus that occurs during an asthmatic attack becomes drawn out and rolled up under the influence of the forced respiration of an asthmatic attack. This explanation is substantiated by the fact that spirals of a similar character occur in the eye during the so-called mucous keratitis (Fädchenkeritis). The mucous fibrils of the conjunctiva become rolled up around their own axis by the frequent winking. But this does not explain why the Kurschmann spirals occur constantly in such large quantities in asthma and are so seldom met with in other forms of pulmonary affections, such as bronchitis and pneumonia. It must be remembered that these peculiarities of the asthmatic sputum, namely, the Kurschmann spirals, the Charcot-Leyden crystals, and the eosinophile cells, are by no means pathognomonic for this disease, but occur also in other affections, especially in chronic catarrh, though by no means so frequently, nor in such large quantities, as in asthma. The crystals and the eosinophile cells are often seen, and this is important, in certain nasal polyps.

If we ask ourselves what is the nature of this remarkable disease,

one thing is sure, that usually asthma bears a certain relation to bronchitis. The bronchitis may begin as an ordinary cold, with snuffles and hoarseness, though it develops later a number of peculiarities. Clinically, the disease has many of the characters of the affection which is described by Laennec as *catarrhe sec*. The pulmonary affection extends over the lungs, and gives creaking and whistling sounds, and very shortly after this the characteristic sputum is to be seen. Kurschmann was right when he separated bronchial asthma and ordinary bronchial catarrh. This form of bronchitis can last for a very long time. Its duration is, however, very variable. It may occupy but a few days; it may persist for months, and in severe cases may never completely disappear. In children it comes on not infrequently under the form of an acute cold, which occurs a number of times during the year, and may never be properly recognized until an examination of the sputum shows the true nature of the disease. While this bronchitis brings with it a certain degree of difficulty of breathing, still, the asthmatic attack has something in it that is peculiar to itself. It brings a more or less suddenly eruptive difficulty of breathing, which is excessive in degree and puts an end, as it were, to the bronchitis.

How does the attack come on? The most plausible explanation would be that an especially copious secretion of mucus closed up so many bronchi, or narrowed them, that a very high degree of dyspnœa resulted. This explanation is supported by the fact that the attack becomes milder just as soon as the patient succeeds in bringing up a large amount of sputum. But this explanation is not sufficient, since, often enough, we see an asthmatic attack run its course without any large amount of mucus being expectorated afterwards. And, on the other hand, a bronchiolitis may often last for weeks, and the patient have an abundant expectoration without a true attack of asthma occurring. To cause the asthmatic attack there must be some other factor.

We may consider that the mucous membrane of the bronchi, in consequence of too great congestion, swell up and narrow the lumen of the bronchi, as occurs in the nose. Such a hyperæmia and swelling of the bronchial mucous membrane must certainly lead to stenosis, and may occur as happens in the nose as a consequence of vasomotor reflexes of the most varied kind. Such reflexes may result from psychical emotions, or from mechanical influences, or may

be the result of certain toxic substances, in which case idiosyncrasy may play a *rôle* in the matter. It is well known that many individuals after partaking of certain food or drugs are liable to be attacked with cutaneous eruptions, usually erythematous in character, yet sometimes accompanied by true exudation, so that urticaria results. It is not difficult to imagine that in such an individual similar influences might bring on an attack of asthma preceded by snuffles and occlusion of the nostrils. It is well known that many an apothecary's assistant has an attack of snuffles, or even of genuine asthma, whenever he has to handle ipecacuanha. I know a man who has an attack of asthma every time he drinks beer.

The best known example of this kind can be found in hay asthma. This disease, which is a good deal more frequent in England and in North America than in Germany, is seen in susceptible individuals with the greatest regularity every year about the time that the grass ripens, and its pollen being blown about rests on their mucous membrane. Immediately after this there occurs in these patients a hyperæmia of the conjunctiva, followed by a copious flow of tears and snuffles. Not infrequently an urticaria-like exanthem and a true asthmatic shortness of breath also develop. The real explanation of the origin of this affection can only be that the irritation of the pollen produces a vasomotor reflex from the nasal mucous membrane.

It seems not improbable that ordinary asthmatic attacks have a like origin. Still another explanation for the asthmatic attack must be considered. It is well known that the bronchi contain a not inconsiderable layer of unstriped muscle, which encircles them and may produce contraction of their lumen with infolding of their mucous membrane. The theory has been advanced that a sudden emotion or some other cause may act upon the bronchial nerves, and so produce contraction of these bronchial muscles. The consequence of this contraction would be an attack of asthma, and this would explain why the attack is so often preceded by the clinical symptoms of a narrowing of the bronchi, which can be noted in the high-pitched, musical râles that accompany the attack. We might even think that the whole process occurred as a reflex from the nose. Finally, the theory has been advanced that an asthmatic attack may be due to spasm of the diaphragm. It is a well-known fact, as we have seen in the case of our patient here, that the inferior border of the lungs, and with it, also, the diaphragm, occupy a very low position in the

body during an attack of asthma. Whether in these cases there is question of a clonic cramp of the diaphragm, such as occurs in sighing, or a persistent tonic cramp, is not easy to decide.

It is easy to demonstrate, however, that the diaphragm continues its excursions even during an attack of asthma. Its lower position than normal may be at such a time, indeed, much more easily explained than by an appeal to the occurrence of cramp in the muscles composing it. It may be supposed that, in consequence of the narrowing of the lumina of the bronchi while air is drawn into the lungs during inspiration, it does not readily find its way out, and as a consequence the lungs became more and more dilated with air. The muscles of inspiration are, besides, much more powerful than those of expiration, and so are able to overcome better the hinderance to function in the bronchi. For this reason, too, the dyspnœa of asthma, as may well be observed in our patient, is mainly expiratory.

Whether the asthmatic attacks be due to vasomotor hyperæmia and congestion of the bronchial mucous membrane, or to a spasm of the bronchial muscular fibres, or is due to cramp of the diaphragm or to some nervous reflex, it is sure that nervous influences play an important *rôle* in the etiology of the affection. It is not without good reason that asthma has been reckoned among the neuroses. Nevertheless, you must not imagine that asthma occurs by preference in neuropathic individuals. Asthma does not belong to the heritage of what the French call the *famille neuropathique*, families with hereditary nervous tendencies. On the contrary, it is classed in France with a very different group of diseases, namely, with affections due to the uratic or uric-acid diathesis; that is to say, asthmatic attacks occur especially in those families that are liable to gout and other diseases that, like diabetes, bear a close relation to gout.

It is well known that asthma occurs in certain families, and that several brothers and sisters may suffer from it. The circumstance, however, that true asthma may be connected with nervous processes makes it clear that many factors that influence the nervous system may set up an attack, and, on the other hand, as regards the therapeutics of the disease, certain remedies and measures for the treatment of asthma have an influence that can only be explained if we accept the conclusion that they act by suggestion. I once saw a good example of this in an intelligent and educated woman who did not seem to be at all neuropathic. She was an actress, who suffered from

typical attacks of asthma, and, as they sometimes kept her from appearing in public, seriously disturbed her in a professional way. She put herself under the treatment of a specialist in nervous diseases, who succeeded by means of hypnosis in so ameliorating the attacks as to make it possible for her to appear regularly in public. As the patient herself explained the matter to me, by the influence of the hypnosis the real asthmatic attack was aborted, though a certain shortness of breath remained behind.

We have seen from the examination of the expectoration of our patient that the specific products of an inflammation of the bronchi are present in very small amount. There is, it is true, a certain amount of albumen, and even some material almost purulent in character. The greater part of the sputum consists, however, of mucus, and is a secretion rather than an inflammatory product. It is even possible that this secretion of tenacious mucus which practically always accompanies asthmatic attacks is really to be attributed finally to nervous influences.

An analogous affection is that known as mucous colitis, in which, after attacks of severe pain, copious amounts of tenacious mucus are evacuated from the bowel. It was formerly thought that the ribbon-shaped, or at times even cylindrical-shaped, masses that occur in this disease were composed of fibrin; but it has recently been shown that they are true mucus. This disease occurs mainly in women, and especially in nervous individuals of that sex. Its analogy with asthma consists, above all, in this, that after completely healthy intervals, renewed attacks with very severe pain may occur, and that they are followed by the evacuation of large amounts of mucus, which bear less the appearance of an inflammatory process than of a secretion.

Asthma bears a very close relationship to bronchitis fibrinosa. In the latter disease, after violent attacks of severe difficulty of breathing, large branched moulds of the bronchi are coughed up. The extreme ends of these branched moulds are often twisted into genuine Kirschmann spirals. Besides, Charcot-Leyden crystals have been demonstrated in the expectoration of these patients. I remember once seeing a case in which the disease existed at the same time with an obstinate chronic eczema.

A certain connection between asthma and chronic skin diseases is not unusual. If the history of asthmatic patients is carefully taken, it will often be found that during childhood or later in life

they suffered from persistent cutaneous affections of one kind or another. They have had obstinate, ever relapsing eczema of the face, the extremities, or the trunk. Or else they have suffered from skin diseases of another group that resemble urticaria very much, as strophylus infantum or prurigo. At times it is noted that the asthma attacks follow the skin eruption; again they occur at the same time, and many a patient is afraid to see the skin affection grow better in the children, or to have it treated, since they fear "to drive the disease in" and cause the asthma to supervene.

The latter group of skin diseases mentioned, and perhaps also the first one, seems to have a neurotic basis, or to be due very probably to certain anomalies of the vasomotor and trophic nerves in the skin. It has often been remarked in hay-fever that around the nose and the lips acute erythemata and swellings take place, and even true urticarial eruptions in these regions have been noted. Prurigo especially exhibits certain analogies with bronchial asthma, since in its lesions in the skin a large number of eosinophile cells have been noticed, and it has a tendency to disappear finally after puberty. Many young persons affected with asthma, who suffer a great deal from the disease between their tenth and sixteenth years, are of slight frames and backward in their development. They especially have small, narrow, childish thoraxes. Such patients usually lose their asthma towards their twentieth year if they develop satisfactorily about the time of puberty, and often have not a trace of the affection in all their after-life. If the asthmatic attacks persist beyond their twentieth year, then the ultimate prognosis for the disappearance of the disease is quite unfavorable. It will usually remain for the lifetime of the patient.

The prognosis of the disease in adult cases depends a good deal on whether excessive emphysema of the lungs with anatomical changes in them occurs or not. Occasionally, tuberculosis of the lungs develops as a consequence of the asthma.

As regards the therapy of asthma, we have in it another proof of the relation the affection bears to certain skin diseases. The best remedy for asthma is arsenic. A course of treatment with arsenic for some weeks, as Trousseau long ago pointed out, seldom fails to lessen the number of attacks, and to cause an amelioration of the bronchitis that accompanies them. At times no attack will occur for months under this treatment, and a repetition of the course of

arsenic will cause a still longer intermission. The next best remedy is iodide of potassium, because it produces a large amount of thin secretion, and so aids expectoration. To many patients the inhalation of the smoke of burning filter paper which has been previously soaked in a solution of saltpetre will bring relief for the acute symptoms, especially the difficulty of breathing. Others find relief in smoking belladonna and stramonium leaves. Stramonium cigarettes become indispensable to certain sufferers from asthma. Chloral hydrate internally or morphine by hypodermic injection often brings amelioration of symptoms.

On the theory that asthmatic attacks may be due to reflexes from the nose, the nasal mucous membrane has been treated. Hack reported successes after such treatment. Polyps have been removed, hypertrophic turbinate bones operated upon, bony and cartilaginous deformities corrected. Sometimes the success has been agreeably surprising. In some cases the asthmatic attacks have returned after a year or more, so that the cure was not a permanent one. Sometimes further treatment of the nose was effective, but usually it was not. The enthusiasm that at one time existed for nasal operations in asthmatic cases has practically died out of late years.

Among the most important therapeutic measures for asthma must be reckoned climate and altitude, and, unfortunately, no general rules can be given as to the climate that may be most effective for any particular case. On the contrary, the most bizarre contradictions of what might ordinarily be expected, take place with regard to the locality in which an asthmatic patient may find relief. A place that helps one patient fails entirely with another. It is often not the localities that are well known for their good fresh air that bring asthmatic patients relief. Many a patient from the country feels better in the city. In England it is reported that asthmatic patients sometimes find in the very heart of London, where, as is well known, the air is heavy, foggy, and impure, the relief that they had sought in vain at watering-places and the like. I have often noted that asthmatic patients who were sent to the sea-side were worse there than at home. Sometimes mountain altitudes do harm, but usually they give marked relief. Each asthmatic patient is a problem by himself in this matter, and must be studied as such; and meantime it must not be forgotten what an important *rôle* suggestion plays in the treatment of the disease.

ALBUMINURIA OR PROTEURIA IN YOUTH.

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THE factor of age enters into all physiologic equations. Certain functional peculiarities of infancy, childhood, puberty, maturity, and old age are marked; so it may be expected that certain tendencies to disease, certain forms of functional disturbance, certain liabilities to structural impairment, will exhibit themselves characteristically in the respective cycles of age. This expectation is peculiarly fulfilled in the early periods of life. Here the feature of growth, of constructive metabolism, is the dominant physiologic fact. The organism is in the making. It has an evident instability of form, a broad range of functional elasticity. The rhythm of action is a wide one and structural integrity is easily imperilled in its exaggerant swing. Among the organs which especially illustrate these qualities is the kidney. At once the avenue for the disposal of the most complex forms of tissue waste and the by-path along which the absorbed products of intestinal decomposition are removed, it is subject to marked and frequent variances in the quality and quantity of the excretory materials delivered to it. Acutely compensatory in its relations with other vascular areas, it bears the burden of the most sudden and pronounced changes in the volume and the force of the blood-tide flowing through it. The possibility of these changes is increased by the large latitude of blood-pressure which lies between the renal artery, arising from the abdominal aorta, on the one side, and the renal vein, discharging into the vena cava, on the other.

When one considers the rapidity of tissue change, the large mass of new material undergoing construction and leaving a certain unused increment to be disposed of, the easy liability to intestinal toxæmia, the wide range of functional activity, calling for rapid variations of blood-supply, which are characteristic of youth and, especially, of the period of puberty, it is not strange that the func-

tions and structure of the renal filter should be extra-sensitive to impressions at this period of life. It does not follow that such disturbances are always to be regarded with that serious apprehension which a limited knowledge of renal disorders has been apt to inspire in the past.

It must be borne in mind that, until a very recent period, urinalysis has not been a matter of clinical routine; that it is so now only within a still limited group of clinicians. Save as serious disturbances of function have enforced the attention of the physician has examination of the urine been a common custom of medical practice. But, with the adoption of more systematic methods of diagnosis and with the closer pursuance of the details of case-taking among the few, the profession is awakening to the fact that the kidney is the seat of disorders of frequent occurrence, hitherto unnoted, of all degrees of significance and of the greatest variety in form. It is learning, moreover, that albuminuria, so called, is not necessarily indicative of renal disease. Even life insurance companies, who are properly slow to follow the somewhat unsteady torchlight of medical opinion, are coming to study more cautiously urinary conditions which were once supposed to predicate the positive impairment of a life-risk.

In evidence of these facts and of their peculiar application to the young lies the discovery, vagrantly noted but not yet systematically followed up, that albuminuria is a frequent phenomenon of youth.

While, at any period of life, the presence of proteids in the urine is no longer properly regarded as proof positive of some established form of renal disease, it is now a commonly observed and a carefully studied signal of functional disorder. Later dictionarians and writers have referred, with some uncertainty, to the albuminuria of adolescence and have employed the somewhat vague terms of cyclic and physiologic albuminuria in this relation. It is with the intent to confirm the recognition of this form of a so-called disorder and to give more definite meaning to the terms which describe it, that the present report is made.

During the past four years, the writer has correlated the results of some three hundred urinalyses of specimens obtained from persons ranging in age from three to seventeen years. Seventy-five per cent. of these observations have been made in the course of some form of acute and usually slight or transient disease. Among these

maladies have been included cases of inflammatory croup, follicular tonsillitis, influenza, bronchitis, broncho-pneumonia, dyspepsia, gastro-enteritis, colitis, catarrhal jaundice, intestinal toxæmia, habitual or periodic headache, neuralgias, chorea, juvenile hysteria, astigmatism and eye-strain, and the disorders of early menstruation. Contagious diseases and all cases suspicious of suppuration in any form have been excluded from the record. The cases recorded have gone on to ultimate recovery or improvement. In two per cent. only has evidence of permanent renal disease exhibited itself. A sufficient number of observations, for control purposes, have been made upon persons of similar age in apparent health.

As a result of these studies, certain propositions may be laid down with which the writer believes that the experience of clinicians, who have made a systematic study of the subject, will more or less generally agree.

1. The word albuminuria, as descriptive of the conditions of the urine in these cases, is too narrow a term to fairly cover their clinical history.

2. The so-called albuminuria of youth is of common occurrence and is usually transient.

3. It is often of so slight, so short-lived, so purely functional a character and attendant upon so mild disorders, so occasionally occurrent during apparent health, as to justify the view that it falls in some instances within the limits of physiologic variation.

4. It is sometimes so periodic in appearance as to suggest its association with certain physiologic cycles of function.

5. It is a symptom which, according to its degree and duration, or to its association with or isolation from other evidences of disease or physiological disturbance, or to its periodicity, or to its clinical history in the matter of results, may be traced:

(*a*) To structural changes in the kidney;

(*b*) To the presence of foreign proteids in the blood;

(*c*) To dietetic excess or digestive disorder, leading to the partial digestion of proteids and to the absorption of certain by-products;

(*d*) To marked disturbances of the balance of vasomotor control in the renal areas;

(*e*) To associated states of the organs of generation, in consequence of which the mere accident of albumen or other proteids is contributed to the urine.

In support of these propositions, it may be observed, first, in the matter of terms, that in the present stage of clinical information upon this subject the term albuminuria is a misnomer. The clinical conditions are better represented by the general term, proteuria. While serum-albumen is the form of proteid most commonly present in the urine, simply because it has the readiest diffusibility of any of the normal blood proteids, the globulins are also of frequent discovery. The arbitrary dictum of certain writers that the presence of nucleoprotein (albumen) is not to be considered as a form of albuminuria, or, rather, proteuria, is unjustified. It is a normal globulin of the blood and lymph. Its existence in free form is now understood to be consequent upon the disintegration of the leucocytes. An apparently twin product is uric acid. There are good reasons for believing that an excessive formation of fibrinogen is a further accompaniment of this leucocytic destruction, in which event its coincident appearance in the urine, a fact which has been occasionally verified, might be explained. In youth the metabolism of the leucocytes is peculiarly active and liable to easily excited changes. Albumoses and peptones are also to be occasionally found in the urine.

These several urinary proteids should be carefully differentiated from each other, since upon that differentiation often depends a recognition of the proteuric state. It cannot, however, be admitted, at the present point of knowledge, that the elimination of any one form is essentially significant of any graver condition than the elimination of another.

It may be noted, secondly, in the matter of frequency, that proteuria was discovered in eighteen per cent. of these cases of disease under observation; that its presence was not markedly dominant in any one of the disorders included in this study, with the notable exception of intestinal toxæmia; and that its presence was determined, at certain times, in four per cent. of children examined who were in apparent health.

Recognizing the generally uncertain value of proteid tests, no one method has been relied upon in ascertaining the presence of proteids. It has been confirmed by coagulation, by Heller's method, by the picric acid, and by the acetic acid and potassium ferrocyanide tests.

Third, in the matter of degree and duration, it should be said that, in the great majority of instances, the quantity of proteid pres-

ent was slight; that it was of transient appearance, varying in its exhibition from one day to two weeks; in some instances appearing and disappearing, alternately, within brief periods of time; and that, in over fifty per cent. of the instances cited, it was not accompanied by a decrease in the total quantity of the urine voided in twenty-four hours.

Fourth, its periodicity was noted, within a diurnal range, in several instances, while a wider cycle of recurrence was illustrated by four cases, in young girls, in whom, at puberty, proteuria appeared from five to ten days before each menstrual event. In three of these cases its appearance was associated with periodic headache and with an excess of uric acid in the urine.

Finally, upon the etiology of proteuria both clinical and physiological observations have thrown a new light which reveals the inadequacy of earlier views. That proteuria has not always the grave significance it was once believed to possess is illustrated by the fact that in only two per cent. of these cases were renal casts discovered.

At the same time, recent researches have shown that the presence of foreign proteids in the blood, whether introduced experimentally in animals; therapeutically, as in the albuminuria induced by Roux's antitoxin; or derived, as doubtless they often are, from the intestinal absorption of mal-digested proteoses, will excite the kidney to their discharge. No proof of disease of the organ lies in the mere exercise of this selective function of the renal filter. It is excited by the presence, in excess, within the blood, not only of proteids, but of sugar and of certain salts.

In a number of instances, prolonged intestinal dyspepsia or toxæmia was found associated with proteuria. In these cases the temporary withdrawal of all proteid food and the irrigation of the alimentary tract, from above and from below, were followed by a rapid disappearance of proteids from the urine. A repeated excess of proteids in the diet, under such conditions of disorder, will frequently provoke a recurrent proteuria.

It is not to be supposed that this short cut from the intestinal tract to the kidney is always involved in the development of this form of albuminuria. Nitrogenous bodies, reacting to proteid tests, frequently appear in the blood as the result of an imperfect nitrogenous metabolism in the tissues, upon either its constructive or destructive side. Such a disordered nitrogenous metamorphosis may be existent,

moreover, and may be of the gravest significance without involving the renal discharge of its foreign products. It may lead up even to those forms of uræmia in which the presence of albumen or its congeners in the urine is not to be determined by present clinical methods.

Excessive blood-pressure and volume in the renal areas may, undoubtedly, disturb the selective function of the glomerular cells and induce a hyperfiltration, as a result of which traces of the blood proteids appear in the urine. The occurrence of proteuria in young hysterics, or in girls at the approach of menstruation, when a marked vasodilatation obtains, in which the kidney sometimes dominantly shares, illustrates this class of cases. Structural impairment is not necessarily entailed. The production of excessive dilatation of the arterioles, by experimental means, has determined a similar result accompanied by an increase in the total quantity of the excretions.

At the period of puberty in the male it is not an uncommon circumstance that the seminal organs or their adjuvant glands permit the escape into the urinary channels of an albuminous secretion, as do the vaginal glands in the female, which, becoming admixed with the urine, determines an accidental proteuria. Attention should be paid to this possibility in the event,—a possibility which discounts, at once, its seriousness from the renal or metabolic stand-point.

Continued study of this interesting question, in all its phases, will doubtless determine, still more positively, the occurrence of types of proteuria in the young which are sometimes transiently pathologic, which are often non-renal in their origin, which are possibly physiologic in degree and, again, are either narrowly or broadly cyclical in their appearance.

STENOSIS OF THE AORTA NEAR THE DUCT OF BOTALLI.[1]

CLINICAL LECTURE DELIVERED AT THE VIENNA GENERAL HOSPITAL.

BY HERMANN SCHLESINGER, M.D.,

Privat Docent at the University of Vienna and Assistant Physician to the Third Medical Clinic of the Vienna General Hospital.

GENTLEMEN,—The patient whom I present to you to-day offers so much that is interesting that his case may justify a discussion at some length. Even his history is distinctly peculiar. More than twenty years ago, the patient, who, up to that time, had complained of no discomfort in spite of the severe physical labor of his occupation, met with a serious accident. He fell from a third-story scaffolding and was so injured that it took him several months to recover. After he was able to leave his bed he began to suffer from certain symptoms he had never noticed before; such as palpitation of the heart and shortness of breath, especially when going up-stairs. The strength of his legs gradually decreased. Nevertheless, the patient, who is nearly fifty years old now, stuck to his arduous occupation, until his constantly increasing infirmities compelled him to take ever lengthening intervals of rest. I have had him under observation now for somewhat more than five years. In the later years there have been, from time to time, great difficulties in swallowing, so that occasionally not even a drop of liquid could pass through his œsophagus. According to his statement, solid foods lodged at the level of the upper end of the sternum. At the same time he says his breathing was very labored when lying down (stenosis breathing), and was characterized by a loud, whistling sound. There has also been a very profuse hæmoptysis on several occasions. He has always been very temperate in the use of spirituous drinks, and denies any specific infection.

[1] Translated by James J. Walsh, Ph.D., M.D.

Looking first at the patient's back, you will observe that the outlines of a series of vermiform growths can be seen at a number of places underneath the skin. On palpation, these can be recognized as rather hard, pulsating arteries. Close inspection shows that they are grouped not without a certain order. A series of them encircles the thorax at a horizontal level. In the neighborhood of the angle of the scapula on the right and left sides respectively you can follow three such large, extremely tortuous arteries that run horizontally, and can be traced from the axillary line almost to the vertebral column. You will also see, farther up, approximately corresponding to the lateral edge of the scapula, a very tortuous artery running downward and connecting with the branches above described. In the upper part of the interscapular space you see close beside the spinal column a double arterial vessel, almost the size of a penholder, and which can be followed for one and a half centimetres of its course.

But the patient presents even more extraordinary symptoms. If you palpate the left axilla, you will feel, lying against the wall of the thorax, a convolvulus of cord-like vessels, which feel not unlike a varicocele. They are pulsating blood-vessels of the thickness of a penholder, or even larger, and have very thick walls. They run very tortuously, several of them beside each other. The pulsation is somewhat sluggish, the blood-vessels are rather slow in filling, yet there is no appreciable difference in time between the apex-beat and the pulsation in the convoluted clump of arteries we feel here. Formations that are very similar to those described already are to be felt in the left axilla. At that point, however, the clump of arteries is somewhat smaller.

What do these arterial anomalies signify? Have we in these convoluted arteries an arterio-racemose aneurism? This would be a rather peculiar localization for such a formation. Moreover, there is the fact of the perfectly symmetrical development of the growths on both sides. This would itself speak against the probability of a cirsoid aneurism, which, though it may cover large spaces, rarely appears in widely separated parts of the body at the same time, and never symmetrically. Neither would this assumption explain why the arteries on the back of the thorax are so dilated. This condition suggests the thought that the dilated blood-vessels represent a collateral circulation. This collateral circulation is, of course, to take

the place of some large blood-vessel which has suffered at least a temporary stenosis.

If, now, we palpate the arteries which are easy to get at, we find the following: The radial arteries are alike on both sides, well filled, and show slight arteriosclerotic changes. The pulse of both arteries is slow, the typical pulsus tardus. The subclavian and carotids, on both sides, are well filled and somewhat dilated. The tension of the arteries is distinctly increased. The condition of these arteries has not always been the same during the long time the patient has been under my observation. Some years ago I noted an exquisite pulsus celer in the arteries mentioned. While at present the pulse cannot be felt in the ulnar nor in the interosseous arteries, it was at that time perfectly distinct in these situations. The pulsation was strong even in the digital arteries.

On auscultation, when I first saw him, the radial and the brachial revealed a distinct systolic murmur. There was a capillary pulse; in short, the symptoms apparent were those one finds so often in the peripheral arteries when there is incompetency of the aortic valves. Now it is to be noted that the symptoms have gradually changed to those we mentioned above. At that time, however, it was singularly noticeable that all the arteries were not affected in the same degree by the changes usually incident to incompetency of the aortic valves. On examination of the arteries of the lower extremities, we could not detect the pulse in the tibial artery, nor in the dorsalis pedis, either on the right or on the left side. This circumstance appears the more peculiar, as we now know, through the investigations of Erb, that usually the pulse can be found in all four of these arteries upon careful examination.

Under certain pathological conditions (incompetency of the aortic valves, or pseudo-incompetency), the pulsation is very easily observed, and the contrast between the arteries of the upper and of the lower parts of the body was most remarkable. But still further. We could find no pulse in the popliteal space, not even in the femoral or popliteal artery itself. Hence, in the upper extremity a distinct pulse can be felt even in the digital arteries of the fingers, while in the lower extremity there is failure of the pulse in arteries of the size of the femoral.

It is not surprising that such a state of affairs almost necessarily aroused the suspicion of local disturbances in the large blood-vessels.

We tried to discover the condition of the abdominal aorta. We could feel the vessel rather distinctly through the walls of the abdomen, and there was not even a trace of pulsation to be observed in it.

As the arteries of the left upper extremity still had a very good flow, while there was no pulse in the abdominal aorta, we argued that there must be a deflection of the blood-current between the point of origin of the left subclavian artery and the passage of the aorta through the diaphragm. But of that more hereafter.

First, we must ask ourselves, Was there an incompetency of the arotic valves years ago, when we first saw the case? and, if there was, why did the symptoms of it disappear?

To answer these questions, it is necessary to ascertain the condition of the heart by examination. The apex-beat is found in the mid-axillary line in the seventh intercostal space, and rises with great force against the finger. The heart dulness is not broader than normal at the base of the heart, nor does it reach farther to the left than the left border of the sternum (absolute dulness). The lower edge of the sternum shows no pulsation. The heart, therefore, shows an enormous eccentric hypertrophy in regard to its left ventricle,—that is, the so-called cor bovinum, or bullock heart.

Through all these years the same murmurs were to be heard on auscultation. A very loud, long-drawn-out, almost musical systolic murmur can be heard over the whole cardiac region. At the apex of the heart this sound goes over into the diastole also. At the lower end of the sternum one hears, besides, a low, soft murmur in the diastole that lasts for a very brief period. This sound may also be heard in the second intercostal space on the left of the sternum. In the corresponding point of auscultation for the aorta, the diastolic murmur is of similar tone quality, but louder and longer drawn out. Above the heart there is no tone to be heard anywhere. What we find in the heart as well as in the peripheral arteries gives evidence of an incompetency of the semilunar valves of the aorta. This pathological condition must still exist, though the characteristic symptoms may have been obscured by later changes. As we hear a very distinct systolic murmur to the right in the second intercostal space, we may, without stretching the facts, connect it with a stenosis of the ostium of the aorta. This stenosis has developed gradually, as happens almost invariably, after the incompetency of the valvular mechanism has persisted for some time. In consequence of the constantly

increasing stenosis, the symptoms of incompetency of the aortic valves, indicated by the condition of the peripheral arteries of the upper parts of the body, continually decreased, so that even now the stenosis of the valve ring, or aortic orifice, is the most important heart lesion that exists in the case.

The assumption, however, of an incompetency of the aortic valves and a secondary, serious stenosis of the valve ring, does not in the least explain all the remarkable phenomena which we have found in the lower extremities as well as in the trunk. We must, as has been previously stated, hold fast to the idea that the peculiarities of the arteries compel us to draw the conclusion that the blood in the thoracic aorta has been forced to find a new path for itself, because there exists an obstruction to the flow of the blood through the aorta itself.

Now, of what nature could this obstruction be? A compression of the aorta to any serious degree by tumors is very rarely found. This has been affirmed by all authors who have investigated the subject to any extent. In the numerous cases of tumor formation in the mediastinum, I have rarely found changes in the size of the subclavian artery, and *never* in the aorta itself. Professor von Schroetter, the director of the clinic here (Third Medical of the University of Vienna), once observed a case in which the pressure of an aneurism of the arch of the aorta on the thoracic aorta caused the gradual obliteration of the artery. Such a condition, however, must be characterized as indeed most extraordinary. If, however, the blood-vessel is not closed through exterior pressure, the stenosis must be caused by changes on the wall of the vessel itself. After the anatomical observations we have made in the case, we are now perhaps in the position to state more accurately where is the point of the narrowing.

It seems that only twice has a stenosis in the aorta been observed at the level of the diaphragm. The one case (complete obliteration), observed more than sixty years ago in Vienna by my namesake, H. Schlesinger, seems to be unique in literature, down to the present time. In the other case, reported by Power, the stenosis of the aorta occurred at the level of the cœliac axis. In all other reported cases the stenosis occurred higher,—in the region of the termination of the ductus Botalli in the aorta, sometimes above the insertion of the duct, sometimes on a level with it, and sometimes below it. This

stenosis has been observed repeatedly even in infancy. It occurs not rarely in connection with anomalies of development of various kinds, particularly those of the vascular system. Repeatedly there existed in these cases a persistent ductus Botalli,—sometimes merely a duplication of the aortic valves; sometimes a defect in the septum of the heart; sometimes a dextrocardia has been the fundamental anomaly. It is to be remembered that Martens estimates the number of malformations in other parts of the body as only thirty-eight per cent. of those that are observed in the vicinity of the heart.

All the observations made so far suggest the thought that the condition of development played a very important part in the formation of this stenosis. Rokitansky has offered in explanation of the anomaly a persistence of the so-called isthmus aortæ,—that narrow vascular tube which during fœtal life unites the thoracic aorta below the left subclavian with the point of origin of the abdominal aorta, the latter, as is well known, having its blood flow at this time from the right ventricle through the ductus Botalli. In extra-uterine life there is a dilatation of the isthmus aortæ, and this part of the artery becomes as wide as the other parts of the aorta with which it is connected, while the ductus Botalli becomes obliterated. If, however, the isthmus does not dilate, or does so insufficiently, a stenosis of the aorta forms, which, on the further growth of the individual, causes increasing disproportion between the size of the arch of the aorta and of the isthmus aortæ.

To this theory Skoda a few years later added another: besides the persistence of the isthmus aortæ, he assumed an invasion of the wall of the aorta by tissue elements from the ductus Botalli. Through the shrivelling of this tissue, which is capable of retraction in a very high degree, during the process of involution at the end of fœtal life, the conditions for an increasing stenosis are created, and the formation of those contractions which occur beneath the insertion of the ductus Botalli are explained. Brunner recently took up Skoda's hypothesis again and tried to extend it by assuming that tissues of the character of the tissues of the ductus Botalli occur by a sort of fœtal inclusion at other portions of the walls of the aorta. This explains the contractions that are met with in the region of the insertion of the ductus Botalli, though not directly in connection with it.

Still other hypotheses have been advanced (for example those of

Bochdalek, Shevers), but a combination of those of Rokitansky and Skoda seems to offer the best explanation for the conditions.

The stenosis itself is often very serious. A few years ago I observed the case of a young man, where one could barely pass a very fine sound through the contracted point. There have been numerous such observations.

The aorta frequently becomes funnel-shaped towards the point of contraction, or, as in the cases of Martens and of Schichold, there seems to be a thin partition stretched straight across the aorta; sometimes the stenosis is due only to crescent-shaped folds.

The condition of the aorta above the stenosis is of great interest. In a very large percentage of the cases—according to Brunner, one-third—atheroma is observed immediately above the stenosis; frequently even a dilatation occurs. Sometimes real aneurisms of the aorta are found (including Martens; six cases of this have been published up to the present time). We shall have to come back to the latter point.

Much more striking, however, is the repeated finding of atheromatous degeneration immediately below the contraction, as in the cases of Leudet and of Eppinger, and in a case that was under my own observation some time ago, or even gas-bubble dilatations increasing to real aneurisms, as observed by Bochdalek, Rosenstein, Reynaud, Kriegk, Degen, and others. These conditions may be due to the fact that blood flows into the abdominal aorta in other ways,—that is, by means of a collateral circulation,—and then takes a course opposite to the normal in the wide tube of the aorta back to the obstruction; for, according to a well-known physical law, when the liquid in a tube is under pressure, all parts of the tube are subject to an equal amount of pressure. If, when this reversed blood-flow reaches the stenosis, the same conditions of poor nutrition exist below as above it, the arterial wall is subject to a strong and continuous pressure, and degenerates on this account by an atheromatous process, and may also experience localized dilatation.

We have just been speaking of collateral circulation. It is the collateral circulation which constitutes the characteristic finding at the autopsy in a case of this kind. A case of stenosis of the aorta having been recognized as early as 1789 (reported in Desault's *Journal*), and Graham having proved by a case observed in 1814 that even the complete obliteration of the aorta was not necessarily

fatal to life, the ways by which the lower half of the body are supplied with blood in such cases had already become the subject of eager investigation early in the century. Meckel, who was one of the pioneers in this matter, published, in the year 1828, an exhaustive study of the collateral circulation. His monograph on the subject is still an authority in all essential particulars. The collateral arteries are either the superficial or the deep ones. It is probable that the superficial collaterals are much more frequently dilated than we assume to be the case at present. (Barié thinks that it is possible to locate them only in about one-fourth of the cases.) Usually, however, they have not been searched for in life, and frequently not at the necropsy, either. In three out of four cases, which I observed personally, the existence of the superficial collateral arteries was manifest. They were very much dilated and tortuous, and the pulsation was usually distinctly visible. In one of my cases the collaterals were so strongly developed that the back of the patient appeared to be covered by a tangle of writhing and twisting worms. The superficial collateral arteries which are especially dilated are: The transverse artery of the neck, arteria transversa colli; the long thoracic, thoracica longa; the transverse scapular, transversa scapulæ; the posterior scapular, dorsalis scapulæ; the intercostal artery; and the internal mammary, mammaria interna. (An accurate history of the collateral circulation may be found in the works of Kriegk, Barié, and von Schichold.) The internal mammary artery is often most extraordinarily dilated, even to the thickness of one's little finger, as occurred in one of my cases, and occasionally may then be perfectly palpable in the abdominal walls. I believe, with Professor Shroetter, that even the extremely dilated internal mammary does not become visible by a pulsatory raising of the anterior chest wall except in the rarest cases. Skoda pointed out that vascular murmurs sometimes arise in the dilated collaterals, which may then be heard over the greater part of the thorax, and with particular distinctness along the course of the internal mammary artery. Bamberger even heard a hissing murmur along the entire abdominal wall. During the past year I observed, in a case of stenosis of the aorta, a musical murmur extending over the entire thorax, which may well have had its origin in some of the larger collaterals.

And now to return to our case. If we follow the course of the internal mammary with the stethoscope, we hear a distinct musical

murmur at the level of the navel. We noted before large, superficially lying arteries, in perfectly symmetrical order, which according to our previous conclusions are surely collaterals; we have found an absence of the pulse in the abdominal aorta, while there is a fairly good volume of blood in the arteries of the upper half of the body. After all this there can be no question that we have a case of *stenosis of the aorta in the region of the insertion of the ductus Botalli.* The conditions with which we have to deal are, however, somewhat more complicated than mere stenosis of the aorta, as there are still further changes in the circulatory system. There exists, also, as we have shown above, *an incompetency of the semilunar valves of the aorta and a secondary stenosis of the aortic orifice.* There are, therefore, between the left ventricle and the passage of the aorta through the diaphragm at least two contractions within the sphere of the greater circulation. In this respect, also, our case is not unique. There was a double contraction in a case observed by Martens,—of course, only below the point of origin of the left subclavian. Nixon and Almagro have also given us histories of some double contractions. It is true, however, that it might but rarely be possible to diagnose a double stenosis in life, and then only when, as in this case, the conditions are unusually favorable.

But, even as it is, we have not given satisfactory explanations for all the symptoms of this patient. I have stated that occasionally the act of swallowing became exceedingly difficult for the patient; large morsels of food appeared to lodge in the œsophagus at the level of the upper end of the sternum. On one occasion the patient had to be nourished for several days by rectal injections, because even liquids were forced up immediately after drinking. The intermittent stenosis of the œsophagus, therefore, must have been very serious. At the same time respiration was very labored, and there was a loud stridor heard during both inspiration and expiration. The stenosis murmur could be heard with equal distinctness over both lungs. In addition there was at this time very profuse hæmoptysis. The laryngoscopic condition was constantly normal, so also was the condition of the trachea, though these examinations were made only after the symptoms described above, especially the difficulties of breathing, had passed off. I was not able to obtain any dulness alongside or beneath the sternum.

The temporary symptoms of stenosis on the part of the œsoph-

agus and of the trachea would rather suggest an aneurism. Now, in fact, as has already been stated, an aneurism of the aorta above the stenosis has been repeatedly observed. And the knowledge of this circumstance is of very particular forensic significance, as a rupture of the aneurismal sac may follow upon a very slight trauma, and with it, as a consequence, a fatal termination may ensue. Thus, in the case of Jordan, observed by Oppolzer (who was the first to diagnose this affection during the life of the patient), as there was a rupture of an aneurism of the ascending aorta, the cause of death was given as a rupture of the aorta, which was slightly dilated just above the stenosis. Willigk describes a case in which an aneurism of the aorta was ruptured just above the stenosis; so also does Laudet, in whose case the perforation occurred into the main left bronchus. In a case observed by Kriegk, a fatal termination followed upon the perforation of a dissecting aneurism in the mediastinum. In the observations of Kriegk,—he studied three cases in all,—and in those of Martens and of Schichold as well, there were also dilatations of the aorta. Schroetter noted such dilatations, too, in a case observed only clinically, and Bamberger also assumed their existence in a case under his observation.

As the results of the autopsies supported the clinical assumptions in previous cases, we may, on the strength of the existing symptoms, diagnose the case before us as having also an aneurismal dilatation of the aorta besides the stenosis.

Our complete diagnosis will, therefore, be as follows: *Stenosis of the aorta at the point of insertion of the ductus Botalli; stenosis of the valvular ring of the aorta with incompetency of the aortic valves; aneurism of the aorta above the stenosis.*

The development of a second stenosis at the aortic orifice evidently contributes either to prevent entirely the rupture of the aneurism, or at least to delay it. The force of an enormously hypertrophic left ventricle is sufficient at times to induce a rupture of the aorta even without an aneurism (cases of Degen, Wise). In our case this force is broken to a large extent by the first contraction, situated above the aneurism, and the opportunity for the partial formation of a thrombus is thus, fortunately, supplied.

It is remarkable, however, how well the patient has endured his sufferings in spite of his complex ailments. Until a very few years ago he was not even incapacitated for work. Medical literature con-

tains a number of such examples, in which there were remarkably few disabilities apparent. I have been able to examine two other cases in which there was also such an extraordinary absence of subjective symptoms that the patients were not aware of the seriousness of their own ailments. In one instance, that of a student, the patient would not believe that he was dangerously ill; and five minutes before his death, caused by œdema of the lungs, he even demanded to be dismissed from the hospital, as he insisted that he was only momentarily indisposed and not at all seriously ill. It is plain that such patients easily over-estimate their strength, and do more than the already overstrained heart can endure. It is the part of the physician, in cases recognized sufficiently early, to intervene by precautionary measures, and thus to prolong the life of the patient.

CHANNELLING OF THE RADIAL; ANEURISM OF THE SUBCLAVIAN: ANEURISM OF THE THORACIC AORTA,—A STUDY IN PULSE.

CLINICAL LECTURE DELIVERED AT THE MIAMI MEDICAL COLLEGE, CINCINNATI.

BY MARK A. BROWN, M.D.,

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GENTLEMEN,—The two patients before you I have had brought in together in order that you may see, first, how valuable is the study of the pulse, and, secondly, how little reliance can be placed upon its findings unless it is taken in conjunction with other symptoms. Both patients are males and apparently of about the same age, between forty-five and fifty. Both, I may add, have given histories of old syphilitic infection, and one was sick about twelve years ago with acute inflammatory rheumatism. We will first take up the discussion of the latter patient. His principal complaints are shortness of breath on slight exertion, and at irregular intervals vague pains in the cardiac region, never, however, amounting to the intensity of an angina. These complaints, taken in connection with his admission of syphilis and rheumatism, naturally direct attention first to the heart. You will observe the rather forcible impact of the heart against the chest-wall. Palpation shows the apex-beat to be in the sixth interspace in the vertical nipple line. On percussion we find the heart somewhat enlarged, particularly in its transverse diameters. These signs, combined with the auscultatory phenomena,—a greatly accentuated second sound, and a loud blowing murmur, systolic in time, heard best at the apex and transmitted to the axilla and the angle of the left scapula,—readily allow us to make a diagnosis of incompetency of the mitral valve. But what I wish to especially call to your attention is the condition of the radial pulses. Dropping your finger upon the left pulse, you will find that while the tension is somewhat less than you would probably expect from a heart beat-

ing so forcibly, yet it is full and regular. The pulsations of the right radial, however, are barely evident to the touch, and one is compelled to search for some time in the usual locality of the artery ere he is sure that pulsation is beneath his finger. If you will take a pulse in either hand, this great difference will be more readily detected. Naturally, the first impression that comes to one's mind is of some interference with the main arterial supply between the aorta and the wrist. Continuing our examination, we find that the pulsations of the carotids are equally forcible, and this narrows the field of investigation considerably. Almost unavoidably, when there is a marked difference of pulsation in two corresponding arteries, the conclusion is hastily arrived at that an aneurism exists as the direct cause; and this, indeed, is a most common etiological factor. Again, I must call your attention to the history of syphilis in this case, as well as to the fact that specific disease is one of the most important precedents of aneurism. The existence of a cardiac murmur in this case would lend aid to the supposition of aneurism were it not for the fact that we have already satisfied ourselves that it is dependent upon a cardiac lesion,—mitral insufficiency. Supposing that we are dealing with an aneurism, it could hardly be of the aorta, and cause a marked change in the radials without a corresponding change in the carotids or brachials or both; and you have all felt that the pulsations of these vessels are equally forcible each to its corresponding artery. For the same reason, no aneurism can exist in the subclavian, the axillary, or the brachial. The fault must clearly lie with the radial artery itself. On examining further, about two inches above the styloid process of the radius, you will see an old linear scar about an inch in length running downward and outward—that is to say, towards the radial side. At a former visit he told me that ten years ago he had received a cut at this point, and that the blood had spurted to such an extent that the doctor had tied the vessel. You will remember from your studies in pathology that after occlusion of a blood-vessel by ligature, thrombosis, or embolism, thrombosis takes place upon either side to the establishment of a collateral circulation. This clot may undergo various subsequent changes, the one which is of particular interest to us now being the so-called organization into connective tissue. In some cases, not all, a wider channelling takes place in the fibrous cord, and the circulation, but to a markedly lessened degree, is re-established. I believe this is what

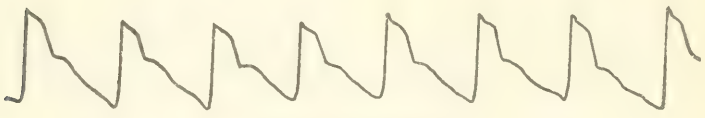
has happened in this patient, and the presence of a normal brachial pulse, together with the existence of very forcible pulsation upon the ulnar side of the hand, lends strength to this view.

The second case is of much greater interest. In addition to the specific history mentioned above, he was told eight years ago, by a specialist in lung diseases, that he had tuberculosis so advanced that he would not live a year. A year and a half ago he had another slight hemorrhage from the lungs. The physical examination of the chest, as written in the notes taken at a previous clinic, is as follows: Inspection, negative. On palpating apices, apparently normal; but on directing the patient to take a full breath, a most decided thrill is detected just behind and a little below the middle of the right clavicle palpating from above the clavicle. Auscultation at this point negative, but on full inspiration a loud blowing bruit synchronous with the action of the heart is heard. This bruit is loudest at the end of the deep inspiratory effort, gradually disappears on expiration, and cannot be heard at all on quiet breathing. The area of maximum intensity of the bruit can be covered by a silver dollar. Again directing the patient to take a long breath, deep dipping along the posterior clavicular surface from above gives a pulsating tumor, the outline of which cannot be readily determined. Percussion, negative. You have all of you, no doubt, observed the frequent reiteration of the statement that all these symptoms are only brought out *on deep inspiration*. With such a group of symptoms, there can be no question but that we are dealing with an aneurism of the subclavian artery. Since our last meeting, I have reviewed the literature of aneurism of this artery for the past ten years, and have been astonished to find that all the articles treat of the surgical aspect only. Not one has mentioned the symptoms so well shown in this case, and which must be unquestionably present in a large percentage long before an external tumor is recognized. You would naturally expect that the radial pulses would show marked differences in time and force, and it will surprise you to find what little variation exists in either respect. These sphygmographic tracings, which I will pass around, show the difference in force better than can be detected by the palpating finger. They are both taken under the same amount of pressure.

It is the unexpected that is always happening, and in no profession or occupation is this oftener the case than in medicine. In this

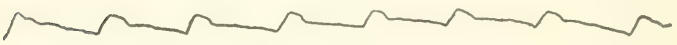
first patient, for example, we have at first glance a well-marked instance of aneurism, the diagnosis being made from the difference in radial pulses alone; yet, as you have seen, we have been able to rule out aneurism absolutely as the cause of this variation, and to find a

FIG. 1.



Left radial artery tracing.

FIG. 2.



Right radial artery tracing.

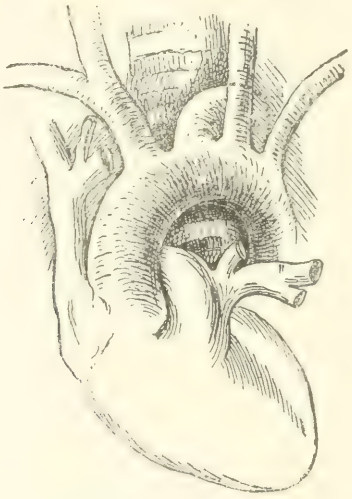
very plausible explanation for the almost complete obliteration of the right radial. No sphygmographic tracing was attempted, as the artery beat far too feebly to make any accurate impressions. In the second case, with an undoubted aneurism, we have apparently no change in the pulse, at least to the finger, though, as you see by the tracings, the difference is well marked. The explanation of this latter fact is not as difficult as would at first glance appear. You will remember that no external tumor existed in this case. You will perhaps recollect from your previous studies that aneurisms are divided into three main varieties,—sacculated, fusiform, and dissecting; the former of which is far the more liable to produce an external tumor. Taking into consideration the position of the aneurism, the fact that it must be of considerable size from the intensity of the thrill and bruit, that even on deep palpation but an indefinite tumor mass can be detected, that there is little or no delay in time and but slight lessening in force in the radial pulse, I believe the aneurism from which this man is suffering to be of the fusiform variety. There is another point in the etiology which I wish to call to your attention. This patient has had both syphilis and tuberculosis. The latter disease he tells me affected chiefly the upper part of the right lung,—that is to say, in the neighborhood of where we now find an aneurism. We know by the reports of Flexner and others that tuberculosis may affect the aorta and other large vessels secondary to cheesy masses outside their walls, though apparently not by direct

extension. We know further that an aneurism may be due to any factor causing a weakness of the vessel wall. In other words, tubercular infection may, by weakening the walls of a vessel, be an underlying cause of aneurism. In the brain tuberculosis is a frequent cause of aneurism of the cerebral vessels. In this case, in that we have a history of tuberculosis and that the aneurism is closely connected with the lung, as proved by the presence of the physical signs only on deep inspiration, it is possible that the former tubercular infection may have played some part in the subsequent development of this lesion. The greatest objections to this theory are that we have an undoubted syphilitic history, and that the aneurism under consideration is in all probability not sacculated, but fusiform. I have had these two patients brought in together, as in a way they are out of the usual run and present some little surprises in diagnosis.

The last case which I wish to present more nearly follows our ideas of the eternal fitness of things, and is what might be called a classical case. This gentleman is here at my request that I might contrast him with the others, so that I will detain him but a few minutes. He is thirty-two years of age; ten years ago he contracted specific disease; and I might say here that there are at present a few copper-colored stains upon his back, plain evidences of the disease. Two years ago he had a slight attack of acute inflammatory rheumatism. He complains of palpitation and occasional attacks of pain around the heart. So far his history greatly resembles that of one of our former cases. Without taking more of your time, I will say that he has all the classical symptoms of mitral insufficiency. You will remember that this organic cardiac affection is accompanied by an apical systolic murmur. As we auscult towards the base, a murmur, systolic in time, becomes increased in intensity, and at the base, both at the pulmonary and aortic rings, is very loud. The systolic murmur at the base may indicate one of several conditions,—aortic stenosis, roughening of the aortic valves, narrowing or roughening of the aorta itself, or it may be hæmic. The systolic murmur at the pulmonary ring may be dependent upon disease of the pulmonary valve, which would be exceedingly uncommon, or to dilatation of the left auricular appendix, which is a not unusual accompaniment of mitral incompetency. However, as the murmurs are of exactly the same intensity, length, and tone over both rings, I believe them to be due to the same cause. The second sound at the base is ringing

and accentuated. Continuing our examination, we find that the murmur continues well up into the neck, maintaining its intensity high up in the right common carotid artery. The pulsation of the right carotid is not only visible, but, as you see, is throbbing, in great contrast to the left side of the neck, where there is no visible pulsation. Indeed, but very slight pulsation can be detected on this side

Fig. 3.



Aneurism of the transverse aorta.

even on deep pressure. On auscultation, no bruit is heard on the left side. At the sternal notch and at the outer side of the attachments of the sterno-mastoids, a very decided thrill can be felt. As you see, however, there is no bulging of the chest at any point. As to the heart itself, it is a little enlarged in its transverse diameters, and, as you may be able to hear from where you are, the limit of dulness rises higher than normal. Again, I wish to ask you to compare the radial pulses. Not only is there a marked difference in force at the expense of the left pulse, but your finger will easily detect a slight delay in the impact of the left pulse; indeed, this is more pronounced in this case than in any I have ever examined. You will all ere this have made a diagnosis of aneurism of the thoracic aorta; but in this case even more can be diagnosed,—namely, that the aneurism is situated at a point where it interferes with the flow of blood into the left subclavian, and particularly into the left common carotid,

and situated on the upper portion of the arch, as a thrill can be felt at the sternal notch. We are safe in saying that the aneurismal sac compresses the left common carotid and also, but to a less extent, the left subclavian. The bruit in the neck I believe to be transmitted from the aneurism, which is in close proximity to the innominate artery. It might be due to transmission from an aortic stenosis; but I believe that an aortic stenosis that would give rise to a murmur of such intensity in the neck would so interfere with the current of blood as to interfere absolutely with visible carotid pulsation. In addition, I believe that it could only exist, when so intense, with a coincident aortic incompetency; and we have already learned that there is no diastolic murmur present, but that the second sound is ringing and accentuated. I also think the basic systolic murmurs to be dependent entirely upon the aneurism. The larynx of this patient shows nothing beyond congestion. Ophthalmoscopic examination reveals pulsation of the retinal veins. There is one symptom of aortic aneurism present in this case which, on account of its rarity, I have reserved for the last. On directing the patient to place the bell of the stethoscope against his teeth, close his lips around it, and then stop breathing, you will hear a loud systolic bruit. This is proof of the proximity of the sac to the trachea, and is due, in all probability, not to the forcing of air out of the trachea by the contraction of the sac, as has been claimed by some, but entirely to transmission along an air-containing tube.

SPECIFIC DISEASE OF THE LIVER.

BY GEORGE L. COLE, M.D.,

Professor of Materia Medica and Therapeutics, Medical Department, University of Southern California.

I CANNOT do better, in beginning a discussion of this subject, than to quote from the latest edition of Osler's "Practice" the following words on the pathology of syphilis of the liver:

"This occurs in three forms: (*a*) *Diffuse Syphilitic Hepatitis.*—This is most common in cases of congenital syphilis. The liver preserves its form, is large, hard, and resistant. Sometimes it has a yellow look, compared by Trousseau to sole-leather, or an appearance not unlike the amyloid liver. Careful inspection shows grayish or whitish points and lines corresponding to the interlobular new growth. Microscopically, great increase in the connective tissue is seen, and in many places foci of small-celled infiltration. Sometimes these nodules are visible, forming firm miliary gummata, which in cicatrizing produce more or less deformity. Larger gummata may also be present.

"(*b*) *Gummata.*—As a result of congenital syphilis these may occur in childhood or in adult life. In acquired syphilis they rarely come on before the second year after infection. In the early stage there are pale grayish nodules, varying in size from a pea to a marble. The larger present yellowish centres at first; but later there is a 'pale yellowish, cheese-like nodule of irregular outline, surrounded by a fibrous zone, the outer edge of which loses itself in the lobular tissue, the lobules dwindling gradually in its grasp. This fibrous zone is never very broad; the cheesy centre varies in consistence from a gristle-like toughness to a pulpy softness; it is sometimes mortar-like, from cretaceous change.' (Wilks.) When numerous, the most extensive deformity of the liver is produced in the gradual healing of these gummata. On the surface there are deep, scar-like depressions, and the entire organ may be divided into a cluster of irregular masses,

held together by fibrous tissue. To this condition the term botryoid has been given, from its resemblance to a bunch of grapes. As a rule, the gummata gradually undergo fibroid transformation. They may, however, soften and liquefy, and, according to Wilks, may form a fluctuating tumor.

"(*c*) Occasionally the syphilitic changes are chiefly manifested in *Glisson's sheath*, in a thickening of the capsule, producing perihepatitis, and increase in the connective tissue in the *portal canals*, so that on section the organ presents a number of branching fibrous scars which may cause considerable deformity."

The symptoms presented by many of these cases are so much like those seen in some of the varieties of ordinary non-specific cases of cirrhosis of the liver, that I suppose many cases might recover, if put upon proper treatment, that are treated as ordinary cirrhosis and go on to a fatal issue. This is particularly true in those cases in which no positive evidence of syphilis exists in other portions of the body, and where the patient, either honestly or otherwise, denies that he has had syphilis. It is astonishing, sometimes, to notice how, for a long period of time, a patient will absolutely deny having had an infection of this kind, evidently not being able to see that such a trouble as a diseased liver might follow after a period of five, ten, or even fifteen years of freedom from everything pertaining to such an early infection. Then, again, another class of people would rather die than acknowledge having laid themselves liable to such a disease at any time in their lives. It not infrequently happens that the physician, after having fully gained the confidence of his patient, perhaps weeks after first meeting him, will be able to elicit a history that cannot be gotten at first. An explanation to the patient of the fact that, if his disease can be traced to a syphilitic origin, the chances for recovery are much more favorable than otherwise, will often aid in securing the evidence we desire. The thought that possibly some cases go on to death without receiving the correct treatment, and the fact that so little attention is paid to this disorder in many of our best text-books, is the reason of my reporting the following three cases, two of which have already been reported to local societies by myself, and published; the other appears here for the first time.

Case I.—Male; aged forty-five years; good family history. For ten years had been a heavy drinker, taking alcoholics straight and regularly rather than periodically. Denied all history of venereal

trouble other than gonorrhœa, but had led a dissipated sexual life for many years. September 6, 1893, I found him confined to his bed. Considerable œdema of lower extremities, abdomen distended with fluid, heart normal, and analysis of urine showed neither albumen nor casts. Paracentesis abdominis had been performed three times previous to this date. On the 17th of September, I drew off the fluid from the abdomen, when a careful examination showed a slightly enlarged liver. Thinking I had a typical case of hepatic cirrhosis from excessive use of alcohol to deal with, he was treated in accordance with this theory, and shut off from alcoholics. Finding he could tolerate large quantities of potassium iodide, it was given in drachm doses three times daily, with small doses of mercurials. During the three months following my first visit to him I drew off the abdominal fluid six times, removing two gallons each time. During the latter part of this period he wore an elastic abdominal supporter, and the fluid accumulated more slowly. He began to gain strength and flesh, and to resume his usual vocation, not forgetting to return to his old convivial habits, much against my solicitation. He continued to take his iodide regularly, and did well, although drinking heavily. The fluid formation ceased entirely, and he went on to apparent health, which continued for many months.

November 1, 1894, I was summoned at midnight (not having seen him professionally for nearly a year) to find him suffering with a very severe gastric hemorrhage. He was prostrated for a few days as a result of this, but in a short time was up again, drinking as before. From this he has gone on to the present time without any further trouble, and I am unable to determine either enlargement or contraction of the liver. The fact of his speedy and complete relief, with no tendency to return, notwithstanding the continued use of alcoholics, and the want of evidence to show that there had been established a collateral circulation, have led me to believe this is a case of specific disease of the liver, although there is no *positive* evidence of syphilis other than the course of the disease, together with the tolerance of large doses of iodides and mercury, and their apparent good effect.

Case II.—Male; aged forty-four years. Father of two healthy children, aged four and seven years. When I first saw him, April 7, 1891, he had been confined to his room three months; most of this time unable to leave his bed. His sickness, however, had extended over a period of two years, and was ushered in by colicky pains in

the hepatic region, and gradual loss of flesh. I found him greatly emaciated, feet and whole lower extremities œdematous, and abdomen greatly distended with fluid. Considerable dyspnœa from the fluid in pleural cavities. Examination of heart and lungs did not reveal any abnormal condition of these organs. I could not procure urine for examination, but elicited the fact that some weeks previously he had been catheterized several times without getting urine, and later on had passed large quantities of such a character that a diagnosis of Bright's disease had been made, and treatment had been instituted in this direction for several weeks. Examination of the hepatic region was unsatisfactory on account of the ascites and hydrothorax. He denied any venereal history. He had been tapped twice within a month previous to my first visit. On the following day analysis of urine showed neither albumen, sugar, nor casts. On the 9th, two days after first seeing him, I drew off ten quarts of ascitic fluid, when examination of the hepatic region showed what seemed to be a hob-nail liver, except that the surface projecting below the ribs seemed more markedly uneven than in any case I had ever seen. He had been taking a pill, which he said contained mercury, and this I had him continue, with the addition of potassium iodide in small and increasing doses. A few days later he informed me that about fifteen years before he had a sore on his penis, which had healed so rapidly, without any further symptoms, that he did not suppose it could possibly have been syphilis, or could have any connection with his present illness. A few days later I met the physician who had treated him years previously in an Eastern State, who informed me that he had a true Hunterian chancre at that time. During the following five months the abdomen was tapped at intervals of ten days or two weeks, and during this time mercurial inunctions and hypodermic injections of albuminate of mercury were given alternately, and the iodide was increased to about two hundred grains daily. He soon began to gain in strength and flesh. The time between tappings was increased, and an elastic abdominal supporter applied. After the thirty-fifth tapping, which occurred June 30, 1892, about fifteen months after the first removal of fluid from the abdomen, he gradually resumed work, and is well to-day. He has continued to take the iodide intermittently, and is apparently in as good health as ever. The liver is normal in size.

Case III.—Male; aged twenty-eight years. Family history

good. Eleven years ago contracted syphilis, and was treated three months, at the expiration of which time he was pronounced well. He was told, however, by his physician, that he might some time have a return of the disease. Two and one-half years before coming to me, in April, 1897, he began to have colicky pains in the abdomen, with occasional diarrhœa. He gradually lost flesh until he was thirty pounds below normal. He had been tapped for ascites several times before I saw him, and had been pronounced incurable. The liver was somewhat enlarged; the urine was scanty, with high specific gravity, and contained albumen. No casts were found. He was placed upon large doses of potassium iodide, and given hypodermics of albuminate of mercury. During the following ten months he was tapped twenty times. The iodide and mercury were continued. Elaterium was also given as a hydragogue cathartic. There has been no accumulation of water in the abdominal cavity since February, 1898, at which time he was able to return to work. He has continued the iodide intermittently to the present time. At times a trace of albumen is to be found in the urine. The liver has become reduced to normal size, and he is practically well.

THE NECESSITY OF MEDICAL ATTENTION TO ABDOMINAL CASES REQUIRING SURGERY.

BY A. L. BENEDICT, M.D.,

Professor of Physiology and Digestive Diseases, Dental Department, University of Buffalo; Special Consultant in Medicine, Buffalo Hospital of the Sisters of Charity, Buffalo, New York.

Case I.—The first case to which I ask your attention is that of a man of thirty-two with cancer of the cardia. A valvular gastrostomy had been performed, and, although the surgery had been beyond criticism, the patient was rapidly failing. The reason was apparent on learning that he had been upon almost a pure proteid diet, without the carbohydrates and fats necessary to support the vital energies. The case also presented two other points of interest from the combined medical and surgical stand-point. His stomach was quite dilated from previous excessive beer drinking, in spite of the commonly accepted surgical dictum that cancer of the cardia occurs with a small stomach, cancer of the pylorus with a large one. This rule, though plausible enough, has many exceptions, either way. The patient undoubtedly hastened his death by forcibly passing a bougie through the œsophageal stricture. As soon as an œsophageal stricture is diagnosed with reasonable certainty, all efforts at instrumentation should cease. By avoiding the irritation of sounds, tubes, and hard particles of food, the patient may continue to swallow liquids and semi-solid food till death occurs from asthenia,—as was illustrated in two cases seen comparatively recently, but which will not be described in detail.

Gastrostomy is a recognized operation to prevent starving in impermeable stricture of the cardia, but the surgeon, as a rule, fails to realize the complexity of the problem which confronts him. If the case is non-malignant, the indication is to make a valvular opening which shall not allow the escape of gastric juice, and through which food may be administered indefinitely. If the case is cancerous, I would urge the making of a simple straight fistula which shall per-

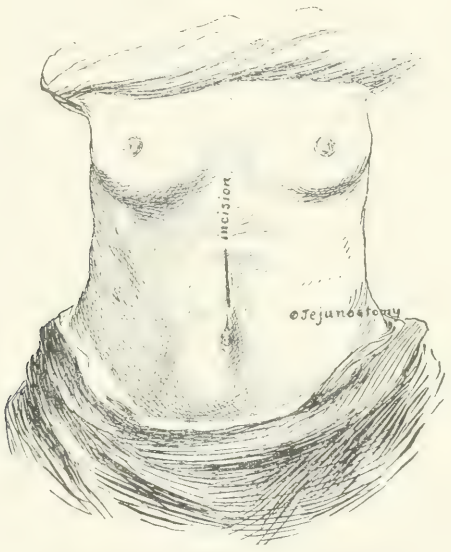
mit inspection, perhaps even local application to the stomach. After the operation, the feeding depends so largely on the study of the chemic and motor function of the particular stomach and on a familiarity with the physiology of digestion in general, that the case ought to be passed into the hands of a medical man. But, even before operation, serious attention should be paid to the choice between gastrostomy and jejunostomy. In one case under my observation, the cancerous disease spread to the track of the fistula, and, in many instances, the stomach which has a cancer at its beginning is entirely worthless as a digesting cavity. To admit food into such a stomach is an abandonment of the principle of side-tracking an incurable disease,—a principle which has proved wonderfully practical in some cases of otherwise inoperable intestinal tuberculosis. (Senn, 1898.)

Jejunostomy is almost ignored in American literature, and has probably been performed less than twenty times altogether.

Case II.—In August, 1898, a woman, aged twenty-nine, consulted me for an obstinate stomach trouble of about a year's duration. She was much emaciated, but did not present what might be termed a typic cachexia. The stomach was dilated, reaching nearly an inch below the umbilical equator. A tumor, the size of a hickory-nut and freely movable, could be felt at the pylorus. The red blood-cells amounted to 31½ per cent. by volume; there was marked leucocytosis. Several examinations of the stomach contents revealed from a trace to .018 per cent. of free hydrochloric acid, with excess of lactates and of organic fermentation. No fragments were found for microscopic examination. At two subsequent passages of the tube, slight obstruction was met at the level of the cardia, suggesting tumor at this site also. It is evident that a positive diagnosis is impossible with such findings, but that cancer of both ends of the stomach is strongly suggested. After observing the case and increasing nutrition by rectal feeding and strychnine, during a period of three weeks, I submitted the case to operation. Nodulated tumors, as large as beans, were found both at the cardia and at the pylorus. There was nothing of the nature of smooth, uniform hypertrophy of the pyloric sphincter. The latter, however, was patulous, and the palpable tumor consisted of a mass of adhesions, the real neoplasm being deeply seated behind the pylorus and firmly fixed. Jejunostomy was performed, resection of the stomach not being feasible. The patient was fed by the fistula for a month, when she complained so bitterly

about it for æsthetic, not physical, reasons, that we allowed it to close. We were agreeably surprised to find that she continued to gain under gastric feeding, and this summer she called on me in a state of apparent health, having gained almost one hundred per cent. in weight, from seventy-four to one hundred and thirty-five pounds, and considering herself free from all trouble. Of course, such a change is

Fig. 1.



From photograph, after recovery, August, 1899.

incompatible with the diagnosis of cancer. Possibly, the tumors were lymphatic enlargements. For obvious reasons, we did not make microscopic sections. At any rate, the case shows what may be accomplished in cases that would clinically warrant the diagnosis of cancer, and that would progress, without radical treatment, to a fatal end.

Case III.—This I mention merely as a contrast to the last. The patient was a young man of thirty-three, in good general health, who presented a tumor at the pylorus as large as a fist, and whose entire stomach below the costal arch was palpable as a hard organ. This patient had been most scientifically treated with repeated washings of the stomach, from the chemic examinations of which he had been assured that he did not have cancer, though the tumor had grown from the size of an egg in six weeks. Now, the probable error in

diagnosis in Case II. is by no means a warning that the next similar case should not be similarly treated by surgery. *A fortiori,* in the present case operation should have been urged immediately, as there was scarcely a possibility of a benign condition, while the state of the patient was most favorable for operation. He left town unexpectedly, with my advice for immediate operation on arriving at his destination; but I have not been able to learn whether he acted upon it.

Most tumors of solid organs within the abdomen may be termed clinically malignant,—that is, the majority are either carcinomatous or sarcomatous, while nearly all histologically benign growths endanger life. The diagnosis of the existence of tumor is made chiefly by palpation; the differential diagnosis as to kind of growth depends on the history and on inductive reasoning from pathologic experience. Cases IV. and VI. show that it is possible to make some estimate of malignant disease by auscultatory percussion.

Case IV.—Dr. G. A. Pohl kindly allowed me to map out the liver of a patient who had died some months after a fall. Besides the ordinary enlarged hepatic contour, there were two large dependent masses, easily palpable and plainly connected with the liver, but not vibrating in unison with it on percussion. On section, these were found to be practically pure cancerous tissue, whereas the liver itself consisted of a uniform shell of normal tissue, inclosing a cancerous mass. The case is also of interest in showing the possible connection between trauma and cancer. A German case of cancer of the stomach has been attributed to a blow in the pit of the stomach by a brake-handle.

Case V.—Another patient whom I saw with Dr. B. H. Daggett presented a diffuse ulcerating cancer of the stomach, and he dated his symptoms from a severe fall.

Case VI.—In a case under the care of Dr. C. E. Congdon, with slight jaundice and no ascites, a New York consultant made the diagnosis of gall-stones, while mine was of cancer. A small lump projecting below the liver was easily palpable, being interpreted respectively as a gall-stone and as a cancerous bossellation. By auscultatory percussion, a marked difference in vibration was found, corresponding to the ninth rib. In view of the difference of opinion, exploratory incision was performed and the trouble was found to be cancer, extending from below to the line marked out by auscultatory

percussion. If enough similar cases could be gathered to enable us to depend upon the results of auscultatory percussion as demarcating a tumor, a considerable gain would be achieved, as almost no other trouble than cancer could have just such limits.

Case VII.—Not long ago, a friend asked me if, by examining the blood, I could tell whether he had to deal with an hepatic abscess or not. The answer was that it would be impossible to state the diagnosis so absolutely without also examining the case. He said, "I thought you claimed that blood examinations were diagnostic." My reply was by another question: "You believe that the temperature is an important sign of typhoid fever; if a thermometer is brought to you from a patient's mouth, can you say whether he has or has not typhoid?" In this case, the blood showed a considerable leucocytosis, which, in the absence of hemorrhage, could scarcely mean anything but pus. A soft, but scarcely fluctuating tumor, the size of a hen's egg, was felt just below the right costal arch and outside the rectus muscle. Six weeks earlier, the patient had recovered from typhoid fever. His present temperature, 103° F., and pulse, 140 to 150, suggested the possibility of a relapse. Bearing in mind the occasional occurrence of empyema of the gall-bladder after typhoid, the diagnosis was made of a collection of pus, either in the gall-bladder or in the right lobe of the liver. The patient was sent to a hospital for immediate aspiration, to be followed without interruption by operation, in case pus was struck. Two or three days later, I was mortified to learn that my diagnosis had been set aside and operation considered unnecessary. After some days news reached me that the patient had malaria, with chills and marked fluctuation of temperature. I asked the privilege of a second examination, and found matters in the same state, except that the tumor could be positively located in the liver. Operation was still more strongly urged, and after two or three days the surgeon consented to open the abdomen. About a pint of creamy pus was discharged. The surgeon kindly allowed me to pass my finger into the liver, which was excavated in three chambers, communicating through narrow door-ways. It was noteworthy that, although a little inflammatory serum was found on the liver, over the abscess, adhesions, which alone would justify delay in evacuating pus, had not formed. After living for nearly a month, the patient died of pyæmia. Examination of the pus for the typhoid bacillus was kindly carried out by F. J. Thornbury, M.D., and Major

Appell, M.D., U. S. A., but resulted negatively. My experience with empyema of the gall-bladder is limited to cases due to gall-stones,—the usual cause.

Effusions within the peritoneal cavity must be quite sharply divided into those due to medical, and usually incurable, diseases and those due to conditions, mainly tubercular and septic, whose only relief is afforded by surgery. The former cases include ascites as part of a general dropsy—renal, cardiac, or hæmic—and local disturbances of the portal circulation, mainly due to hepatic sclerosis. Still, we must carefully investigate for the possibility of a removable obstruction to the portal current. Tapping as a medical operation is simply a confession of the failure of more rational measures, and should only be resorted to to relieve great respiratory embarrassment or some similar condition. Aside from the usual means of diagnosing between free fluid in the peritoneum and encysted fluid, I would emphasize the value of auscultatory percussion, citing the following case:

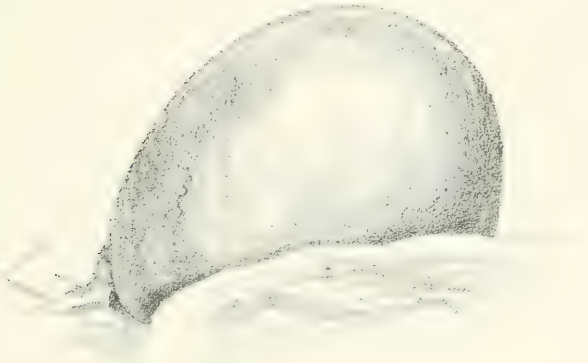
Case VIII.—I was invited to see an intra-abdominal injection of oxygen for the relief of a supposed tubercular peritonitis; but, on examining the patient after she was prepared for operation, it seemed that the intestinal resonance was too far above the usual polar circle in which the hollow organs float when the peritoneum is distended with liquid, and that there was slight resonance in the flanks, where there should have been flatness due to dependent liquid. Auscultatory percussion showed that the lower and anterior portion of the abdomen was filled with a globular mass of different conductivity of vibration from that of the rest of the abdomen; and, as the conductivity of this mass was uniform, I pointed out to the operator that he had to deal with a large unilocular cyst, probably intraligamentary. He did not accept this diagnosis, but, finally, consented to introduce the canula cautiously, following its point with a minute dissection. On so doing, it was soon discovered that there was a large, tough-walled cyst free in the abdomen. The gas injection was abandoned, and the radical operation verified the diagnosis.

Case IX. was similar; the surgeon and his assistants holding to the idea of free fluid. It was not literally unilocular, there being delicate partition walls, which did not prevent the contents from being a single vibratory unit, and the growth seemed to have originated in the ovary. In this case, the translucency test, as employed

for hydrocele, was applied to demonstrate the presence of fluid, but, of course, did not aid in settling the disputed point.

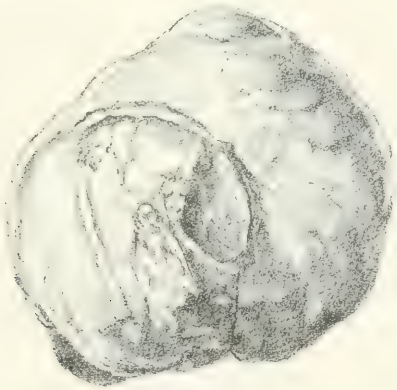
I will close with a protest against the not uncommon practice of making the diagnosis at the time of the operation. I do not believe

FIG. 2.



CASE IX.—Multilocular ovarian cyst with thin partition walls. Diagnosed by ordinary methods as ascites. Diagnosed by auscultatory percussion as cyst, probably inocular, and, therefore, probably intraligamentary.

FIG. 3.



Mass after removal.

that there is an abdominal surgeon who will deny that, taking decent asepsis for granted, the one improvement which has reduced the mortality of cœliotomies more than any other is rapidity of work, and that the next in importance is avoidance of hemorrhage, and that the third is the lessening of the length of the incision. How can a sur-

geon work rapidly, bloodlessly, and through a small opening, if he does not know in advance what he is attacking? It must be admitted that there are instances in which diagnosis fails; but let it be generally recognized that, at least in abdominal disease of a septic or neoplastic nature, it is not the question whether the case belongs to the physician *or* the surgeon. Every such case should have the benefit of expert consideration, both from the operative and the internal medical stand-point.

A FEW THOUGHTS INDICATING A CAUSATIVE CONNECTION BETWEEN THE URIC ACID DIATHESIS AND ASTIGMATISM AGAINST THE RULE.[1]

BY LOUIS J. LAUTENBACH, A.M., M.D., Ph.D.,

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From the results obtained in ophthalmometric work, which has been of daily routine for some six or seven years, I have been convinced that the general bodily conditions influence the cornea and its curvatures, altering its axes and amount of astigmatism far more than by theoretic reasoning seemed possible. The conclusions reached I have embodied in three papers,—one presented to the First Pan-American Medical Congress;[2] the second to the Philadelphia County Medical Society,[3] and the third to your own Section at the Forty-sixth Annual Meeting.[4]

Corneæ of healthy patients were found to be fixed and definite; the astigmatism usually of normal type, or with the rule; as the health conditions were changed and the general vitality and nutrition became impaired, these normal conditions usually gave rise to varying corneal surfaces with a tendency to changes in axes.

While for several years I have been suspicious that the phenomena attendant upon cases in which astigmatism against the rule was present were in some way connected with an increase in the

[1] Read before the Ophthalmological Section at the Fiftieth Meeting of the American Medical Association, held at Columbus, Ohio, June 6-9, 1899.

[2] A Few Thoughts about Ophthalmometry; as to what the Javal Instrument will do and what it will not do. Proceedings of the First Pan-American Medical Congress, 1893, vol. ii. p. 1435.

[3] Some Observations on Corneal Astigmatism and Conditions that change Corneal Curvatures. Proceedings of the Philadelphia County Medical Society, 1894.

[4] On the Local and General Conditions that change Corneal Curvatures. Journal of the American Medical Association, November, 23, 1895.

quantity of uric acid retained in the system, it has only been recently that the conviction has forced itself upon me that the connection is too constant to be accidental, and that some causative relation must exist between the two conditions. It does not necessarily follow that there is any one disease at the bottom of all these cases, as the excessive formation as well as the retention of an excess of uric acid are probably but symptoms of many diseased and perverted states, the symptoms depending probably in great part upon faulty innervation occasioned by an unbalanced functional activity of the various nutritive and excretory organs. In other words, while the exact nature of this want of oxidation of the uric acid is unknown, it is beginning to be a truth with me that the various forms of astigmatism against the rule, as well as its advanced relations, glaucoma, are in some way dependent for their production upon a depraved nutrition accompanied by an excess of uric acid. Of course, there is a possibility that the same unknown causes producing the latter condition might produce the abnormal astigmatism, but were this proved, it would but strengthen the causative relation of the dyscrasia.

Occasionally in the past I have had the urine of such cases of astigmatism analyzed, but this was not done systematically until recently. During the first five months of the present year I have had it done in all such cases (forty-two in all), and in all of them except two the tests indicated a lithæmic condition.

In addition to the urinalyses, attention was directed in all of these cases to the other symptoms of this dyscrasia,—the dry, yellow, scaly skin; the harsh, dry, non-oily hair with a scaly scalp; sensitive, bleeding, and receding gums; inequalities in the strength of the eye muscles; calcareous deposits in the conjunctiva and skin; impairment of corneal nutrition as indicated by arcus and annulus senilis, and by loss in reflectivity; a flabby and swollen condition of the mucous membrane of the throat and nose; frequent headaches; nervous, irritable disposition; irregular circulation; irritable heart; tendency to indigestion, especially of acid flatulent type; pains in the muscles of the shoulders and back of the neck and in the wrists, as well as the more gross symptoms usually classified under the heads of gout and rheumatism.

Of these forty-two cases of astigmatism there were two in whom the astigmatism had been caused by gross interference with the corneal structures,—it having developed as the result of corneal ulcera-

tion. These cases must necessarily be excluded from our consideration.

In the other forty cases the urine of each was typical of the lithæmic condition, being acid, of high specific gravity, developing an excess of the urea and uric acid elements. In these forty cases, they all, after the internal use of phosphate of soda and of the salicylate of soda, or of the citrate or tartrate of lithia, or of thialion or piperazin, and the use of Golindo and Tredyffryn water, showed increased acidity of the urine for a few days, the acid being excreted in larger quantities, which, if the treatment was continued, gave way to an alkaline urine of a lighter color and lower specific gravity, in some cases the specific gravity falling from 1036 to 1018, while the alkalinity continued. Every case tested responded thus.

Some cases under observation for a few months have shown not only a wonderful change in the color, specific gravity, and constitution of the urine, but a corresponding change in the physical characteristics, developing a clearer, less dry skin; hair more oily, less straight and more wavy; the scalp healthier; the loss of the hair being less rapid; the calcareous deposits lessening in extent and number; the eye muscles more nearly balanced; the gums being firmer and healthier; the stiffness and soreness of the wrists, arms, shoulders, and neck have disappeared; there is less indigestion and a better appetite; the general secretions are no longer acid, and the general feelings of poor health, of lack of energy, of headache, have all improved, and the disposition is more even, less irritable, nervous, and exacting.

In a few cases I have observed, after this regular constitutional treatment and the constant use of the proper glasses, that the astigmatism against the rule has lessened or disappeared, and astigmatism with the rule has taken its place.

I especially recall, in this connection, a case treated on these lines by me in 1898, in which this result was brought about in some five months of this treatment. To briefly outline this case may be of interest. This woman first presented herself to me in 1894, and at that time she had a normal astigmatism of both eyes,—the right one being + 0.37 D. ax. 90°, while the left one was + 0.25 D. ax. 90°. Later on, in December, 1895, there was a twisting of these axes, in the right eye the axis being 75° and in the left 105°. This was one of the many cases of changeable axes, a general view of which I re-

ported to you in 1895. Last year, when this case came to me, the astigmatism was against the rule, it being right eye — 0.37 D. ax. 180° and left eye — 0.50 D. ax. 180°. After several months of local treatment with glasses and of alkaline and lithæmic treatment, she is now again back to her former cylinders of hypermetropic astigmatism with the rule.

During the period of treatment, the ophthalmoscope and ophthalmometer, as well as the subjective testing under a mydriatic, gave constantly varying results,—situated somewhat between these extremes.

Case VI., quoted in my paper[1] read at Baltimore, is one of the same character. This was a case of glaucoma in a woman forty-five years of age, where the astigmatism in both eyes was — astig. axis 180°, in whom, after thorough treatment by laxatives and alkalies, not only was the sight of the eyes saved, but the astigmatism was converted to + astig. ax. 90° in one eye, reverting from + 0.25 D. ax. 180° to + 0.75 D. ax. 90°.

I first directed attention to this apparent rheumatic or lithæmic origin of corneal curvature changes in my paper read before our County Society in 1894,[1] having previously called attention to the changes, but not having been able to arrive at a reasonable explanation of their occurrence. At present, I am convinced that it is often caused by the condition known as lithæmia. I know that occasionally I observe such changes in patients who have no subjective symptoms of such disease, but there is always present some depraved general condition, affecting the nutritive functions. So far, I have never failed to be convinced of the uric acid diathesis in every case of astigmatism against the rule in which I paid any special attention to the discovery of such a condition, and, as before mentioned, during the past five months all my forty cases of the trouble tested and examined were sufferers with this dyscrasia.

In quite a number of my patients appropriate local and general treatment overcame the difficulty, normal astigmatism with the rule resulting. In a few patients so controlled there has been a redevelopment of the eye condition as the uric acid diathesis reasserted itself.

The reason that more is not known about this condition may be that cases are relegated too soon to the family doctor after the prescription for the glasses has been written; indeed, many doctors

[1] See foot-note on page 171.

seem to think that the eye doctor's work ends always with the ordering of glasses. In my special work on these cases I have been much hampered in this way. By way of illustration, I will present to you a case which recently came to me. She was a Mrs. W. N. B., aged thirty-six years, and had been a sufferer with severe headaches and indigestion for years. She had a typical, dry, sallow skin; straight, dry hair; local muscular pains; heart pains at apex; easily tired, often incapable of mental work. She had a ringing in both ears and a catarrhal rheumatic condition in throat, nose, and ears. Her urine was acid, brown in color, 1032 specific gravity, showing excess of urea and uric acid. The astigmatism was against the rule in both eyes. I ordered for her at once, R. E. — 0.25 ax. 180°, L. E. — 0.37 ax. 180°, for constant use, and used phosphate of soda and tartrate of lithia internally, with Golindo water, treating the eyes, ears, nose, and throat locally as well. She progressed very rapidly at first, but after a few weeks of well-doing, tired of the work and neglected it, when her symptoms again returned; then she consulted her family physician. Upon meeting him about this time, I informed him as to the nature and progress of the case and the need of accomplishing at once the maximum of benefit with the idea of giving her ease, comfort, and the use of her eyes, and with the view of avoiding the possibility of the development of glaucoma or other serious nutritive disturbances of the eyeball. After explaining this to him, he said, "Well, she has her glasses, has she not?" as if this was all that was necessary to be done, while it was but the commencement of the treatment.

I have given you these thoughts with the view of obtaining your experiences and views on this apparent connection, which is to me not only exceedingly interesting, but has proved of immense value in a class of cases which were formerly especially worrying on account of their unsatisfactory results. Now, I find that my results are exceedingly good, and should the condition return, the recurrence is just as readily controlled.

THE TIME OF HEART MURMURS AND THE SIGNIFICANCE OF THE APEX-BEAT.[1]

CLINICAL LECTURE DELIVERED AT THE UNIVERSITY OF ROSTOCK, GERMANY.

BY PROFESSOR MARTIUS,

Director of the Polyclinic and Professor of Special Pathology and Therapy at the University.

GENTLEMEN.—Our first two patients this morning have heart murmurs; that is to say, when you listen to their hearts you find instead of, and in addition to, the familiar sounds to be heard in this region normally, certain adventitious sounds. In the one case, a young girl of eighteen, with outspoken symptoms of anæmia, extremely pale skin, and pale mucous membranes and conjunctiva, we have a soft, blowing, systolic murmur, heard especially near the apex. In the other case, a man of thirty, there is a murmur that occurs just before the systole begins, fusing with the systolic sound.

There was a time, and it is not so long ago, when every heart murmur was taken to mean the existence of a heart lesion; but the constant testing of heart diagnoses by comparison with post-mortem findings has shown us that for a heart murmur to have assured diagnostic value, other signs of a heart lesion, notably some dilatation of the heart, must be present. When heart murmurs were considered so significative, they were studied with a care that is not so solicitous, perhaps, now that other symptoms are considered necessary for diagnosis. Heart murmurs remain, however, our surest guide to the character and position of a heart lesion, and so deserve the most careful study.

Merely to divide the cycle of heart sounds into diastolic and systolic is to neglect the great advantages that practice in listening to the heart sounds and recent physiological teaching may give us in locating murmurs more exactly. When it was first suggested that the detection of adventitious sounds over the heart gave a clue to a

[1] Reported by James J. Walsh, Ph.D., M.D.

heart lesion, I am sure that it seemed difficult enough merely to catch the murmur. Each one of us in his evolution as a physician passes through this stage, as an embryo, it is true; but to stop at the recognition of a murmur and the placing of it in relation to the systole or diastole alone is to neglect opportunities to judge of the exact significance of murmurs by still further dividing the cycle of heart sounds, a thing not hard to do.

The systole, for instance, admits of division into three parts distinctly separated from one another. There is, first, the time of complete valve closure; second, the time while the heart muscle is contracting; and then, third, the time of complete contraction, which is an appreciable interval. The first incident of systole is a beginning contraction which causes the closure of the mitral and tricuspid valves. Blood does not at once begin to leave the ventricles normally, because the aortic and pulmonary valves are supported by the pressure of the column of blood behind them, and, until the ventricles have contracted sufficiently to put the blood within the heart under greater pressure than that in these large vessels, all the valves remain closed. No muscle, as the physiologists teach, reaches the acme of its activity at once, but the expression of the development of its force is a curve. The time during which the heart muscle is reaching its acme has been calculated to be about .07 of a second.

This is sometimes called the initial ventricular contraction period; but I have preferred to call it the time of valve closure, because, for the moment, all the valves of the heart are closed. The mitral and tricuspid valves are closed at the end of the diastole, and also both sets of semilunar valves, because intraventricular pressure does not yet exceed arterial pressure, and on this fact depends the opening of these valves.

This first division of the systole is not merely a pretty theoretic expression, but may be of great practical utility in deciding upon the significance of heart murmurs. Pure aortic stenosis will not give a murmur during this time, though mitral insufficiency will. While the pressure in the left auricle is just positive compared to the left ventricle, yet it is at the moment practically *nil*, and the blood begins to stream back immediately on the relaxation of the auricle. The detection of the absence of a murmur just at the beginning of systole —for, after all, .07 of a second is a readily appreciable interval—is not so difficult when attention is especially directed to it. Von Noor-

den and myself have published cases in which we have demonstrated graphically that the murmur, though systolic, did not occur during the period of valvular closure.

An objective help that is of great value in such cases is the time of the apex-beat. It occurs during the period when all the valves are closed, for it is just as the heart raises itself to contract on the full ventricles that it comes in contact with the chest wall. A systolic murmur occurring after the apex-beat then indicates an aortic stenosis.

In the diastole, two periods may be distinguished,—first, the period in which the blood is flowing slowly from the auricle, though only under the pressure of the blood in the venous system, or perhaps under the negative pressure in the ventricle; and, secondly, the time during which the vigorous, rapid contraction of the conus venosus and the auricle, which occurs at the end of diastole, drives the blood, which has been accumulating and dilating the auricle, into the ventricle.

It is this rapid contraction of the auricle which causes the so-called presystolic murmur in mitral stenosis. The name presystolic is unsuitable for it from one point of view, since it occurs at the end of diastole, but is not from another, since the wave of contraction that starts in the conus venosus and causes the auricular systole passes on almost without a perceptible pause to cause the systole of the ventricle. In mitral stenosis, the obstacle to the flow of blood from the auricle, where it is under such slight pressure, causes it to just trickle through, the auricle becomes over-distended, and then hypertrophy sets in. After this has taken place, the contraction is more vigorous than before, though occurring at the same time, and so the murmur at the end of diastole is emphatic and sharply defined.

I have here another patient to show you who presents an interesting heart phenomenon. He is is a young man of twenty-three, who finished last year his service as a soldier, who has always been healthy, and especially has never had rheumatism or chorea; in whom, therefore, all question of heart trouble would seem to be excluded. The requirements of military service are so exacting, that it is scarcely possible that a young man with a heart lesion should, even though it is well compensated for, go through the fatigue of it without serious disturbance of compensation. As a rule, then, those with a valvular lesion are freed from service. Even the perfectly healthy sometimes develop neurotic heart conditions which are extremely bothersome and obstinate.

Our young patient comes to the polyclinic (out-patient department) for an attack of bronchitis. During the course of the examination of his chest, it was found that his apex-beat was scarcely visible, there being only just a slight tremor here in the normal location that escapes notice entirely unless carefully looked for. It can be felt, but only weakly and distantly. There are no murmurs to be heard over the heart, and the pulse is good, full, and regular. Are we to conclude that there is any heart weakness in the case, and, if not, what is the significance of the heart-beat in health and disease?

Our young Hercules here, who has a magnificently developed thorax and whose muscles stand out in movement with the regular outlines of health and strength, is able to work hard and does every day. There is evidently no question of heart trouble despite his weak apex-beat, so that this phenomenon may evidently be due to other circumstances than weak heart action. It has often been said that from the strength or weakness of the heart-beat a conclusion could be reached as to the effectiveness of the heart action itself. But the only sure criterion of the heart condition is the pulse, and a little consideration will show us that the heart-beat as it is impressed upon the heart wall, is liable to be modified by too many extraneous circumstances to be anything like a trustworthy exponent of intrinsic heart energy.

Not only may perfectly healthy individuals have very little palpable or visible apex-beat, but those with weak hearts, affected by serious valvular lesions and in a state of disturbed compensation, may have a heaving impulse that would seem to indicate a powerful heart doing most effective work. It may, on the contrary, be accomplishing its duty extremely unsatisfactorily, as the small, compressible, badly filled pulse indicates.

In a well-developed thorax a normal heart may produce but very little impulse on the chest wall. Especially is this true in people who have gone through a serious, well-directed, and well-balanced muscular training. I have often seen young soldiers at the end of their three years' term of military service in whom the apex-beat was scarcely more than a gentle, almost imperceptible touch of the thorax wall. There are two conditions under which the apex-beat becomes notably exaggerated, the first is when the heart itself is for any reason enlarged,—*i.e.*, occupies more space than normally, whether its increase in size be due to dilatation or hypertrophy, and, second, when

proper development of the thorax has not taken place, and there is a certain crowding of its contents from lack of room.

Enlargements of the heart are much oftener due to dilatation than hypertrophy. When hypertrophy takes place, it is nearly always accompanied by some dilatation. We have learned that dilatation takes place much oftener than used to be thought, and that valve lesions are not necessary for its production, but that it may and does often occur with the valvular heart mechanism absolutely intact. In weak, flabby conditions of the muscular system, in our day and in the midst of in-door city life, they are not rarely met with; the heart muscle shares in the general atonic depreciation of muscular function. The result is the development of a certain amount of muscular insufficiency. The muscular walls of the ventricles become overstretched, and the capacity of the ventricle increases, though the amount of blood thrown out during contraction is less. In such cases the disproportion between heart and thorax makes itself felt, and a wide, heaving impulse is communicated to the chest wall. Despite the strong apex-beat, however, the pulse is weak, and the amount of effective work done by the heart is diminished. I have had occasion to demonstrate a number of such cases since my first demonstration before the "Natur-Forscher" Congress at Heidelberg some years ago. In these cases the clinical picture gives an enlarged area of heart dulness, a diffused, heaving heart-beat, and a weak pulse. With no heart murmurs present, we know that we have to do with a weakened, over-distended heart muscle.

The Röntgen rays have shown us in these cases that the ventricles do not empty themselves completely, despite the seeming power exerted. The name idiopathic dilatation or enlargement in such cases is not a good one, as there is nearly always to be found a distinct cause for it; while in the cases where the cause is not to be found as yet, it is only that enough investigation has not been made to bring it out.

Of this dilatation of the heart there is a passing and a lasting form. The passing form we see oftenest and most characteristically in cases of essential or paroxysmal tachycardia. Often in such cases with seemingly healthy hearts, certainly without any of the coarser signs of myocarditis or endocarditis, there is an increase in the area of heart dulness, a heaving apex-beat that sets the thorax wall in tremulous vibration during the rapid beating, and a strikingly weak pulse and sinking blood-pressure. The acute heart dilatation in these

cases would seem to be the prominent causal factor. It is, however, not lasting, and its disappearance causes the disappearance of the other symptoms and the return of the pulse to the normal.

The insufficiency that develops because of dilated and less effective heart walls, Nature endeavors to compensate for, it would seem, by increasing the rapidity of heart action. I have a friend, himself a well-known clinician, who suffers from such attacks, and he has assured me that he has often in his own case been able to follow this series of events in the progression of the symptoms of an attack.

In contrast with this passing dilatation is the condition that develops in certain cases where exaggerated demands are made upon the heart. Symptoms of heart insufficiency develop in large, strong, healthy looking individuals in whom no direct physical cause can be found for the condition. It has been called, for this reason, by Fraentzel, idiopathic hypertrophy of the heart, and is sometimes called primary cardiac hypertrophy. In practically all the cases it has occurred in patients who had for long periods over-exerted themselves. It has been studied especially in Switzerland among the mountain-climbers. It occurs in athletes, in hard workers generally, in blacksmiths, heavy load-carriers or heavy lifters, and in soldiers during exacting service. Here in Rostok we see it in stevedores, especially in those engaged in carrying heavy bags of sugar on the wharves; and a typical example of such a case we had the chance to study together during last semester.

In these cases the large, heaving heart is strikingly in evidence, yet the pulse is as strikingly weak. When in such cases the question of pension for service or of insurance that provides for support during time of inability to work comes up, superficial observation would almost inevitably give the idea of simulation, and a non-medical man is apt to be forced to such a conclusion. After the clinical picture I have given you, you will, I think, be in a position to recognize such conditions when they occur in your practice.

These dilated conditions develop much easier when some affection of the myocardium has preceded, and affections of the myocardium are not so uncommon as they used to be thought. Myocarditis may occur not only as the result of chronic irritation, as from alcoholism or insufficient blood-supply, as in arterial sclerotic affections, or the other factors that induce it so often with advancing years; but it may be the result of an acute infectious fever. Often where there

has been no history of heart trouble, patches of sclerotic tissue are found after death. Rheumatism, for instance, may spare the endocardium over the valves, and so give rise to no valve lesion, and yet give rise to an area of inflammation in the endocardium of the ventricular wall which affects the underlying myocardium, and is followed by inflammatory exudate there, or it may attack the myocardium directly. Such a heart is much more liable to develop the dilatation we have under consideration. The muscle has lost some of its contractility, its action is hampered by the presence of the adhesions caused by the remains of the inflammatory exudate, and so it is easily overstretched. Exertion that would not affect a normal heart leads to symptoms of heart insufficiency in these cases, and as the ordinary objective symptoms of valvular heart disease are absent, their origin seems a mystery. At times, where there has been no history of severe exertion at all, these heart symptoms develop. In growing patients, particularly, do we find them. The strain put upon the heart in forcing blood through the constantly growing circulation seems of itself an exertion. Persistently greater claims are made upon it until in naturally weak and delicate individuals any incidental exertion may cause symptoms of heart insufficiency, and physical examination shows us a dilated heart with increased area of dulness, a broad, heaving apex-beat, and a weak pulse.

The French have described such cases as a developmental hypertrophy, in which the symptoms of dilatation supervene; but the evolution of the condition would seem to begin rather from dilatation than from hypertrophy. The effort to overcome the incipient dilatation causes hypertrophy, and the processes progress side by side, though with the dilatation as the prominent feature. The name, then, of developmental hypertrophy is not a good one, since the cause of the symptoms is really the dilatation.

A special form of this heart insufficiency in young people has been described as occurring in those whose normal breathing has been hindered by the presence of adenoid vegetations in the pharynx. This hinderance of respiration by the hypertrophy of the pharyngeal tonsillar tissue leads to insufficient development of the growing thorax. Faulty inspiration fails to cause that expansion of the thoracic cavity which normally takes place while the tissues are still in their plastic developmental stage, and which is an important factor as regards its ultimate size and form.

The heart is supposed in such cases to be hampered in its action because it is crowded by the lungs, and has not the room required for normal contraction and dilatation, with the certain amount of play on its own axis that these actions involve. Such hearts have been called adenoid hearts, but the term is to my mind misleading, since it is never the merely mechanical impediments that have caused the symptoms. The important etiological factor in these cases is the occurrence of slight hinderances to heart action in people who are delicate, whose general nutrition is lowered, whose muscular nutrition is especially affected, and whose heart muscle, where active metabolism is continuous, is first of all liable to suffer. Patients are often seen in whom the presence of adenoids when young caused faulty thoracic development, yet in whom there has never been the slightest symptom of heart insufficiency. Their general nutrition has been sufficient to enable the heart to overcome the difficulties.

The therapeutics of these cases of heart insufficiency is, of course, absolute rest and a thoroughly nutritious diet. Digitalis may be of help in extremely acute cases, but otherwise is apt to cause irritations that are very annoying. The important thing for the patient is the recognition of his condition, for often there is very little to call attention to the heart. With a weak pulse and a strong apex-beat, however, suspicion should be aroused, and then, if there are the physical signs of dilatation, the diagnosis is clear.

A great deal can be done for such patients by graduated exercises, carefully regulated, mountain-climbing, resisted movements, and the like. Even athletic training has been suggested, and, if carefully regulated, might be of great service; but it is liable to be overdone. The regular training of a military life has been known to do good in certain mild cases; but the severe demands of German military training are usually harmful, and our military medical authorities have come to recognize that fact, and have excluded such persons from the service. Such patients must be made to realize early the absolute need on their part to avoid all over-exertion. After rest and careful nutrition for awhile, remissions in the symptoms occur during which young patients may be tempted to make undue calls on their strength by excursions, bicycling, rowing, swimming, and the like, during the vacations. Of the danger of this they must be seriously warned.

CENTRAL PNEUMONIA; SCLEREMA ADULTORUM.[1]

CLINICAL LECTURE DELIVERED AT THE UNIVERSITY OF GRIEFSWALD, GERMANY

BY PROFESSOR FRIEDRICH MOSLER,

Professor of Special Pathology and Therapeutics and Director of the Medical Clinic at the University.

GENTLEMEN,—I shall show you once more, this morning, the pneumonia case we discussed together some days ago. You will remember the patient's history. He was taken suddenly ill with a chill, and came to the hospital at once, where his temperature was found to be 39.2° C. (about 103° Fahrenheit). His respirations were twenty-eight to the minute, and he complained of some pain under the right clavicle. The most careful examination of his lungs, however, gave us no physical signs of a pathological process at work in them. There was no dulness on percussion, and only a slightly tympanitic sound at the right apex that might indicate that this part of the lung was in a state of over-distention from fatigue. There was no bronchial breathing and no distinct râles, though the breath sounds were a little rougher than normal.

We decided, despite the absence of physical signs, that we had to do with a case of pneumonia,—an inflammation of the central portion of the lung leading to consolidation in the ordinary way, but without the process reaching the periphery to give the usual physical signs of a pneumonia. As support for the diagnosis of pneumonia, we had the characteristic clinical picture,—sudden chill with continuously high temperature, pulse, and respiration for which no other cause was to be found. After the first day in the hospital there was the characteristic sputum croceum, the so-called rusty sputum; and we were able to demonstrate the presence practically in pure culture of the diplococcus pneumoniæ of Fraenkel, the double spear-head picture surrounded by a halo with which you are all familiar.

[1] Reported by James J. Walsh, Ph.D., M.D.

Yesterday came the crisis of the disease, and this morning his temperature is 36.2° C. (about 97° Fahrenheit), a little below the normal, as is usual after the crisis in pneumonia cases. To illustrate the tendency of coincidences to happen in things medical which may be falsely attributed to some law in the matter, and so be utterly misinterpreted, I may mention that our other pneumonia patient also had his crisis yesterday, and that by the merest chance his temperature is also 36.2° C. this morning. Do not let those of you whose turn it is to practise in the wards to-day conclude that this represents a temperature that all patients exhibit after the crisis in pneumonia; for you will find that the most varied temperatures occur, some higher, some even lower, than this, and that there is not infrequently a preliminary crisis, the temperature coming down almost, if not quite, to the normal and then going up, to descend definitely only after twenty-four to forty-eight hours,—that there is, in fact, a series of cases that form connecting links between frank crisis and simple lysis as they occur at the end of pneumonia.

Do not, in general, let the passing coincidences of your first few cases of disease in any line deceive you into the idea that you have discovered specific peculiarities of disease that somehow or other have remained hidden from your predecessors. Above all, do not rush into print with practical hints for practitioners because of a few such coincidences. Medical literature is too full of such things already. Spare your contemporaries, if you do not think too much of your predecessors.

Besides the characteristic crisis, we have now the restful sense of well-being in our patient's general condition which is so typical of the post-critical period of pneumonia fibrinosa; and we have had yesterday and to-day the sputum croceum or sputum coctum (cooked saliva) that comes during the stage of resolution, so that there now remains absolutely no doubt as to the correctness of our diagnosis. You will not often meet with central pneumonia so thoroughly kept from the surface of the lung during its whole course as this. The disease is, I am sure, often mistaken for some other lung affection. The occurrence of rusty sputum in an affection of the lungs, however, should always arouse your suspicions and lead you to look for the diplococcus pneumoniæ. If it is found, the diagnosis of fibrinous pneumonia, despite the absence of physical signs, is assured.

The significance and prognosis of a central pneumonia are not

so simple a matter as the diagnosis. Normally fibrinous pneumonia affects a whole lobe or several lobes, and when it fails to do so, the reason should be looked for, as it may throw light on the further progress of the case and its prognosis. Often there has been some inflammatory process in the lung or some state of chronic irritation that has led to the shutting up of certain lymph paths in the lungs, so that the disease does not find its usual ways of dissemination. Trauma may have produced a similar effect. Such a lung is, however, in a state of distinctly lowered vital resistance, and its reactive vitality may be so diminished that it is not able to throw off the infective material as it otherwise would. Hence in such cases there is often not a frank crisis at the termination of the disease, but a long-drawn lysis that is exhausting to the patient.

During this time of gradual resolution and absorption, it must be carefully borne in mind that the lung may be affected by other pathogenic bacteria that are always in the air we breathe, or the old chronic process for a time encapsulated in the lung may be lighted up afresh. A central pneumonia is always suspicious, and a favorable prognosis is not to be given at once, even though the affection seems but a light one. Our present case, however, notwithstanding that it has occurred in a hard drinker, and you know the usually unfavorable, or at least dubious, prognosis of drinkers' pneumonia, seems not to be going to justify any of our ominous presages. We have had a perfectly normal course for seven days and a frank crisis; but even yet not all danger is over, although I think that now we shall have no complications. Despite presentiments, such cases sometimes run a simple, undisturbed course; and, while you must be prepared for complications, it is advisable not to be outspoken as to the probability of anything untoward or unusual taking place. Unfavorable prognoses produce a great deal of impression, and when mistaken are never forgotten. They must not be lightly spoken of on the strength of possibilities, but must be founded on the actually existent and threatening symptoms of dreaded complications.

The epidemic of grippe, with which we have had to do in recent years, has taught us much about these central pneumonias. As the disease seems almost to have become endemic among us in these last years, I would not have been surprised had we found in this case Pfeiffer's bacillus of influenza. The finding of nearly a pure cul-

ture of Fraenkel's diplococcus pneumoniæ is almost a surprise, and one cannot help but think that another bacterial factor is at work, though its processes in the diseased portion of the lung are not of such a character as to lead to its being thrown off in the sputum, as occurs in the case of the simple exudative inflammation set up by Fraenkel's diplococcus. We have learned in recent years the important *rôle* that secondary infection plays in many infective processes. It may be that here the avenues for the dissemination of the pneumococcus in its usual manner were shut up by the more vigorous inflammatory reaction caused by another bacterium. While this limiting process might seem to be protective in character, the infection that causes it is of a more serious kind, and does not yield to resolution as does the acute pneumonic processes, hence the danger of complications in central pneumonia,—dangers that do not disappear with the crisis.

We shall watch our patient carefully for some time to assure ourselves that no sequelæ are insidiously developing, and he will be kept in the hospital longer than we usually keep our pneumonia patients.

As to the treatment of central pneumonia, it is that of the ordinary pneumonia, and is entirely symptomatic. For the pain, if it is very bothersome, I have found a Priessnitz bandage very soothing. As an expectorant, I prefer small doses of tartar emetic, never carried to the production of nausea. This helps the lung in its effort to throw off the inflammatory exudate, and is a most efficient expectorant. It is to be remembered, however, that it is a heart depressant, and so has a number of contraindications in pneumonia cases. For instance, it should not be given to the old and feeble, or where the habits of the patient, especially with regard to alcohol or the existence of obesity, may lead to the suspicion of fatty degeneration of the heart. It is so effective, however, that in strong patients I combine it with a heart stimulant, and see that the patients get plenty of alcohol. When it is contraindicated, I use ipecacuanha usually combined with musk.

In general, during a pneumonia, the slightest sign of failing pulse should be the signal for active stimulation, and this is especially true just about the crisis. Wine and camphor should be always at hand, and should be freely used if, as sometimes happens, the pulse falls below fifty, or becomes markedly weak or irregular.

For our case of to-day, with a good full pulse of sixty, no stimulation is required.

Our next patient is a woman of forty-two, whose history is briefly as follows: Both her parents died of old age. She has four sisters and a brother living and well; other brothers and sisters died in childhood. She has five children living and well, and has had one abortion, to none of the circumstances of which, however, can any special significance be attached. She had measles when a child, and has never been really sick since. Her family and previous history give us no additional information. Her present affection began last spring, that is, about a year ago, when she noticed that her fingers were harder and stiffer than usual and that there was a decrease of feeling in them. The stiffness increased until she could not bend her fingers naturally, and the skin of the palm and back of the hand grew harder and less flexible. The affection continued to spread, and invaded the wrist and arm. Then she noticed that a similar condition was beginning in the other hand, which spread in like manner to the arm, and then her thorax, and especially her breasts, became affected. Meantime, her toes became stiff, and the skin of her feet began to assume the peculiarities of that of her hands, and this spread up her legs. She has been in a number of physicians' hands, but none of them have been able to do anything for her, and, despite all treatment, she has been steadily seemingly inevitably progressive. In the last few months it has invaded the nates, the lower part and sides of the abdomen, and promises to continue its spread.

You can see the condition much better than it can be described. There is no eruption and no exanthema. Here on the hands is a bluish-red, cyanotic-looking skin, which impresses you by the very look of it, before you touch it, that it is tightly stretched, hard, and unyielding. The more peripheral parts of the hand and arm are most affected. Pressure produces pitting when a good deal of force is used, so that there is some subcutaneous infiltration. We cannot lift the skin into folds at the affected parts, and where folds normally occur in the skin they have been almost entirely obliterated. Despite the thickness and hardness of the skin, there is no elephantiasis, and no falling of the skin into the thick, almost scaly folds which are typical of that disease.

We can follow the changes produced by the disease up the arm.

They are not nearly so marked in the shoulder region; though even here and in the neck you cannot lift the skin up from the other soft tissues to make folds in it. The affection is marked here in the upper thorax, where the stiff, hard, rough, stretched skin justifies the simile of *armor* which has been employed to designate it. Her breasts have, because of the affection, become hard, rough, and distinctly conical, projecting out from the thoracic wall instead of hanging down, only the mammellæ are not affected with a slight circle of tissue around them in the areola.

The disease, or, rather, the symptom that we have here,—for we know practically nothing of the disease except the clinical observation of the condition,—is evidently sclerema adultorum, called also scleroma or scleroderma. All of these names mean only that it is a condition of hardening and contraction of the skin. The word adultorum is put in because there is a similar but much more acute and rapidly fatal condition occurring among the new-born called sclerema neonatorum.

I have now seen some eleven cases of it, though there are in the literature only somewhat more than four hundred cases altogether. We have here a typical case of the affection, and it serves to bring out very well some of the peculiarities of the disease. Our patient is a woman, and it is in this sex especially that the affection occurs. In my eleven cases there were but three men. While the statistics of all the cases are not so striking in respect to sex, it is ever so much more common in women. It develops preferably in the second part of life, and our patient is just past forty. In children,—*i.e.*, exclusive of the new-born, it is extremely rare.

It usually begins, as here, on the upper extremities, and then spreads from the periphery to the trunk; though a certain number of cases have been reported where it began on the toes. Sometimes the sclerotic process remains limited for some time to the fingers or toes, when it is called sclerodactylia. I showed you an exceptional case last year in a girl of twenty-three, in whom it began on the lower extremities and wandered up. When you saw her, her back was already affected.

It usually begins very insidiously. There is, as complained of here, a sense of numbness in the fingers. This is not only subjective, but the diminution of sensation prevents women from handling a needle and other small objects properly. Itchy sensations and other

paræsthesiæ develop, and also creepy feelings and sensations of pins and needles, as if the fingers were continuously in a state of awaking from the so-called "being asleep." These paræsthetic feelings, when we inquire a little more closely into the history, we find to have been present in this case, too.

After the subjective symptoms have existed for some time, at times almost simultaneously with their origin, appear the objective changes in the skin. First, it is slightly elevated and reddened, though at times the color remains normal, and a doughy feeling of œdematous infiltration occurs in the patches of skin affected. This is the first stage, the stadium elevatum, and you can study its characteristics well in the recently diseased areas on our patient's abdomen. Here along the flanks just below the margin of the ribs there are a series of freshly affected spots that have the red, slightly elevated character, and the doughy feel.

After this first stage of œdema comes the second, that of sclerosis of the skin. The skin grows thicker, harder, and firmer, and there is an overgrowth of connective tissue, and especially of the elastic tissue. The subcutaneous connective tissue also overgrows, and there is a gradual disappearance of the subcutaneous fat. This new connective tissue, as might be expected, has a tendency to contract. It affects, also, the walls of the blood-vessels,—if, indeed, the process does not really begin in them,—the blood-supply is partly shut off, and so the skin begins to atrophy. This is the third, the atrophic, stage of scleroderma. In our patient there are only a few spots where the process has reached this advanced stage. Here on the fingers and the hands there are some patches of glancing, shiny skin where atrophy has set in. In advanced cases, this atrophy of the skin may be most marked. The cutaneous tissues may become thin as paper, scaly, and with tendencies to crack wherever natural folds occur, as around joints. The skin becomes adherent to underlying bones, as may be seen here very markedly over the shins, and then the bones may share in the atrophic process.

All trophic processes in the skin are seriously disturbed, for, where these cracks around joints in the brittle skin occur, chronic ulcers, obstinate to all treatment, may develop. Decubitus of the most intractable kind readily develops, and must be carefully guarded against as soon as the advance of the disease by hindering locomotion confines the patient to bed. Our patient is as yet but little incon-

venienced by interference with motion; but she cannot make a fist, for instance, nor perform rapid motions requiring exactness, although she can sew and knit. While it requires more effort to bend her arms than before, she is perfectly able to feed herself, and even wash and comb herself without assistance.

After awhile these patients become practically helpless, and everything must be done for them. They cannot lift their hands to their mouths; they must be fed and cared for in every way as an infant. A marasmus develops as the consequence, and the patients' general health, their courage, and even the desire to live on leaves them. Sometimes the contraction of the skin of the face is of such a high grade that patients must be fed through a tube introduced into a small opening that represents the mouth.

Of some of the changes in the skin we have spoken already. There is at first an œdema, for which, however, no kidney or heart lesion can be found. It is at times most puzzling. I remember, in the case of one of my three male patients, being at my wits' end for the cause of the œdema until the other symptoms of scleroderma began to develop. After the œdema comes a round-celled infiltration, usually in the neighborhood of the blood-vessels in the cutis, the epidermis remaining often almost unaffected. Then comes the overgrowth of connective tissue we have spoken of mainly affecting the subcutaneous connective tissue, involving the elastic fibres especially, and leading to the disappearance of the fat.

The pathological process is not unlike that of a chronic diffuse inflammation, and some people have considered it to be such. As causes for this inflammatory process even microbes have been described, though of late more attention has been given to toxic influences. I lean to the theory that it is a neurosis. Others attribute it to a symmetrical affection of the peripheral nerves, and especially the trophic fibres of the skin. Then the involvement of both the blood- and lymph-vessels has been attributed to a neurosis also, so that it has been looked upon as an angiotropho-neurosis. Analogies have been drawn between it and other symmetrical affections of the extremities, as Raynaud's disease in its preliminary stages before the gangrene sets in, when the fingers become pale, and cold, and bloodless at times, or that other discoloration with paræsthesiæ and pain, erythromelalgia, Weir Mitchell's disease. Of late, too, some connection between scleroderma and the thyroid has been traced. In our

present case there seems to be no pathological change, and no anomaly of the thyroid, and I have not found it affected in my cases generally.

With the disturbance of the perspiration and of the vasomotor changes in the skin, it has been thought that some lesion of the sympathetic must be connected. The most careful search for pathological anatomical changes has not, however, brought the confirmation of the theory. It has been thought, too, that various changes in the central nervous system might account for it. The same holds true as regards changes in the trunks of the peripheral nerves, or, indeed, in their branches as far as they can be followed, so that the disease has yet about it all the charm of deepest mystery.

As to the immediate cause of this nervous degeneration, or, at least, refusal of function, no one seems to have found anything definite. Heredity is thought by some to play a *rôle;* but there is no question of it here, and its importance in the etiology of the disease is, to my mind, overvalued. Exposure to cold and damp, especially here in the cold, damp climate of the East and North seas (the Baltic Sea and German Ocean), has been thought to be a cause, and also living in cold, damp cellars. A case that I saw at Giessen had sewed and knitted with cold fingers, and attributed it to that. Here we have no such complaint. At times a series of attacks of erysipelas have preceded the first symptom of sclerema; but that is rare, and does not occur here. Chronic skin diseases, as eczema and psoriasis, have also been blamed; but it is only the vain seeking for some cause where we candidly know nothing of the real etiological factors at work.

Notwithstanding the progressive character of the disease, treatment is not without its effect. The course of the affection may be rendered slower, and at times a remission of the symptoms, or, at least, a period in which no further advance will take place for years, may be secured. I think that I can even say that in some cases an absolute end of the progress of the disease may be brought about.

A great many remedies have been suggested. I remember in Giessen, on my first case, using a copper salt in small doses. It was prescribed by Skoda, in Wien, at the time as a specific. I think I noted improvement under its use; not because of any specific action, but because of the tonic effect. The salicylates have given good results in some cases. Iron and quinine have their advocates, and arsenic, that panacea for all skin diseases, has been highly com-

mended for this, too. From drugs, however, I must confess I have not had much effect. In this case I am going to try ichthyol, which has been highly recommended of late for these conditions, and whose alterative effect in many chronic affections makes it possible that it may have some gentle, persistent, soothing action to prevent angio-neurotic spasm in this case.

My two favorites for the disease are cod-liver oil and hot baths. From these I am sure I have always seen beneficial effects. The cod-liver oil is taken in large quantities, as much as ten tablespoonfuls a day; though, of course, it must not be allowed to interfere with the patient's appetite. After awhile patients become accustomed to it, and actually take to it as to a favorite article of diet. They fairly reek of it after some time. The hot baths are given at a temperature of 30° Réaumur[1] (100° Fahrenheit), and they must be taken for at least three-quarters of an hour to an hour, if possible. After them she is to be wrapped up carefully in dry, warm, woollen cloths, and allowed to sweat profusely. Her sweating has not been much disturbed, though the sclerosis of the skin often affects the sweat-glands, and anomalies of the sweat secretion are sometimes an early symptom,—absence of perspiration in certain regions being accompanied by profuse sweating in others. Diaphoresis often seems to delay the sclerotic process and keep the skin softer.

Besides the hot baths, we may also employ in this case the Fango mud baths for the limbs; Fango, being a kind of dark mud that comes from near Genoa, may be moulded on a limb and allowed to remain there for hours, and by its gentle warmth and moisture has a resolving effect on all chronic inflammatory processes.

[1] Translators Note.—In ordinary daily life the Germans use the Réaumur scale. The atmospheric temperature, that of baths, etc., is always given according to Réaumur, so that they have the same senseless procedure as ourselves to go through in its translation into the centigrade scale, if they would have its comparative significance as to body temperature and make it intelligible to other nations for scientific purposes.

A CASE OF CANCER OF THE LIVER.[1]

CLINICAL LECTURE DELIVERED AT THE UNIVERSITY OF MARBURG, GERMANY.

BY PROFESSOR MANNKOPFF,

Director of the Medical Clinic and Professor of Special Pathology and Therapy at the University.

GENTLEMEN,—The history of our patient for this morning may be summed up in a few words. She has had no sickness in life that she remembers, though she is now forty-four, except that she has passed worms a number of times. She has even once vomited a worm, which, from her description, was evidently one of the ordinary round worms. About six months ago,—*i.e.*, last fall,—as she says, she noted that her appetite was not as good as usual. She somehow had no desire to eat. It was not a feeling of nausea, and she was not troubled by vomiting. After that she noticed that she was getting thinner.

About two months ago she became yellow; her attention was called to it only after it had already become very noticeable to others. The icterus steadily increased and then vomiting set in. At first, beginning about six weeks ago, she vomited only after she had eaten heartily; but after about two weeks she was unable to retain anything on her stomach. When she came to us, a little over three weeks ago, she was in a pitiable state. Even the most bland, unirritating food was at once rejected, and she had become so weak that she was unable to move, and had to be carried to the hospital.

After assuring ourselves that her stomach would not retain food of any kind, we proceeded to feed her per rectum. Ninety cubic centimetres of bouillon and as much port wine, with two eggs and a little salt, were given as a clyster three times a day, after a preliminary washing out of the rectum. This was admirably borne. Her state of extreme inanition gave way to one of tolerably good

[1] Reported by James J. Walsh, Ph.D., M.D.

feeling. She gained in strength, and all efforts at retching and vomiting ceased. She rested well, a mild hypnotic being needed only occasionally. Three days ago we tried the administration of a little milk by the mouth, and it was retained without any subsequent ill feeling. Then we tried an egg, and afterwards a little chopped beef with some bread and milk. None of them were vomited, so that yesterday we were able to stop the clysters. She continues to feel very well.

You see how deeply jaundiced she is, however, and how dark and portery her urine is. I pass around one of her stools for you all to look at carefully, as it is the characteristic clay-colored stool that shows absolute absence of all bile in the intestine; for it is to be remembered that you may have very severe jaundice and yet have bile (coloring-matter) in the stools. As the absence of bile-coloring matter in the fæces is of great diagnostic importance, and of much more ultimate significance than merely the diminution of the biliary coloring-matter, it is always necessary to convince yourself of this fact by personal examination of the stools. The patient's own description, or that of an attendant, is sometimes taken, but such a procedure is liable to be a source of error.

On the other hand, you see how much bile-coloring matter there is in this urine. It is about normal in amount,—twelve hundred cubic centimetres in the twenty-four hours,—and has a specific gravity of 1008, scarcely as rich as it ought to be, perhaps, in solids. But in her state of absolute rest, with the gradual process of recovery from her former state of inanition, destructive metabolism is not very active, and we can scarcely expect to find the end products of it in the urine in sufficient amount to raise its specific gravity materially. You notice the characteristic greenish shimmer to the foam that forms above it much more plentifully and lasts much longer than over normal urine. When I dilute the urine and pour some fuming nitric acid along the side of the tube so that it comes to lie under the urine, you notice the series of colors at the line of junction of urine and acid are green, bronze, red. If I still further dilute the urine, you can see that violet may also be seen. This is Gmelin's test for bile-coloring matter in the urine, and is a very reliable one.

We have here very large amounts of the biliary coloring-matters in the urine, all of the bile that is being made practically passing

out of the system in this way. We find crystals of bilirubin on microscopic examination, and some few casts thoroughly impregnated with bile, but evidently not enough to make us think of a kidney affection beyond the state of irritation induced by the elimination of the unusual biliary elements from the blood.

Notwithstanding her extreme jaundice, our patient does not feel very badly. She has had no fever at any time, and keeps her bed because of a feeling of intense tiredness that has come over her these last few weeks. Let us find her general condition. She is slight of build with slight skeleton, her tibiæ being, as you can easily see, very delicate. The subcutaneous fat has disappeared all over the body, and especially on the extremities. Here on her feet and legs there is distinct œdema, which can be noted in her thighs also. Here in the inguinal regions there is also some pitting on pressure, and in the sacral region the œdema is easily seen. On her hands, arms, and neck, however, there is none, and her eyelids are not puffy or œdematous, and have not been. It is only the lower part of her body and the lower extremities.

Her breathing is of the costo-abdominal type, though mostly costal, as is usually the case in women. We note that her abdomen is distended as if with fluid, which would also make costal breathing more marked. There is not the constriction at the waist-line usual in women, but her abdomen and thorax represent the frustrum of an irregular pyramid, the narrowest part being in the upper thoracic region. Despite this, her sternum, as is usual in women, has its highest point when she is in a reclining position, here at the mid-sternum; while in men it is normally the lower end of the sternum and the xiphoid or ensiform cartilage which is the highest. Any departure from the normal in either sex always demands investigation as to its cause. It is always pathological, though it may mean no more than a slight congenital deformity, or one produced by some bad habit in the patient's occupation, as, for instance, the well-known shoemaker's thorax.

The antero-posterior diameter of her thorax is about normal. When I compress the thorax with my hand, however, I think I find that it is not as elastic as normal. It is not as compressible, and recovers its original position more slowly after compression has been removed. This is not hard to explain, however, seeing that the distended abdomen probably points to the presence of an effusion

into the peritoneal cavity, and this has forced the lungs up into an unnatural position, and the thoracic muscles have lost some of their elasticity in their cramped position.

On percussion in front, there is a tympanitic ring to the lung sounds on the left, as if that lung were doing compensatory work. On the right, the note under the scapula is higher, as is usual; but here it seems more distinct than normal, partly because of the slightly tympanitic character of the note on the left and partly as if there really were less air in this lung than normal, as if it were working under pressure. Here on the right behind, below the eighth rib, we find distinctly a duller note than on the left. This occurs, however, in patients who have been lying down for a good while, the weight of the liver forcing air out of the lower part of the right lung. This is especially the case in patients who have emaciated recently, and whose tissues are relaxed, for then the liver turns somewhat on its axis from before backward. This causes it to occupy a larger space along the abdominal wall posteriorly, forcing the diaphragm up and compressing the base of the lung.

Percussion shows that heart dulness is smaller than normal in all directions. The apex-beat is not as low down nor as near the nipple as it should be. As our patient has run down very much in weight recently, and all her muscles have lost in substance, it is probable that we have here to do with the loss of a certain amount of heart substance, too. This atrophy of the heart-muscle does not come on until the emaciation is very great, but in a cachexia, such as our patient presents, we might expect it. The heart sounds are perfectly normal, and auscultation of the lungs does not disclose any pathological process present.

Her pulse is soft, low, and not full. It is not much more rapid than usual. The radial artery is somewhat sinuous in its course, and is distinctly to be felt as a tube. Whenever this is the case, some arteriosclerotic changes, as a rule, will be found in the artery; but here there has been such marked emaciation and disappearance of the subcutaneous fat lying above the artery that we cannot lay much importance on the ease with which the artery may be palpated. When we roll it under our fingers its walls are not distinctly thickened, though there may be more resistance than normal.

The appearance of the abdomen, and the fact that so far our examination has been negative, gives us the assurance that here we

will find the materia peccans. Percussion here on the right gives a much larger area of dulness than that usually occupied by the liver, confirming the appearance of a tumor which we had already noted. The dulness begins in the fourth interspace and extends more than three finger-breadths below the margin of the ribs. Its lower margin is on gentle percussion not regular, but shows the presence of projections. To the touch these irregularities are quite noticeable. Here, almost in the mammillary line, we have a deep notch in the lower edge of the liver; just next to it there is quite a prominent projection. This projection occupies about the position of the gall-bladder; just beyond it, as we follow the edge of the tumor, there is another notch. It is almost as if we felt the hilus of the liver with the projecting gall-bladder.

There is no peculiarity about this part of the tumor that would make us think we had merely a highly distended gall-bladder projecting here. The sense of resistance is that of a solid substance or of a thick-walled, if hollow, organ. On percussion, the sense of resistance is more than if the elastic, distended gall-bladder were being discussed. On both sides of this prominent tumor and its notches there are smaller irregularities in the liver to be felt, though these are not easily palpable, even through the extremely thin and yielding abdominal walls.

With the age of the patient, the cachexia, and this tumor, we can only think that we have to do with a cancer of the liver. Primary cancer of the liver is, however, extremely rare, not much more than one case in fifty being surely primary. If this is secondary, where is the primary neoplasm? In women one always thinks first of the sexual organs, but here there is nothing. Liver cancers are often secondary to gastric cancer, but we have absolutely no reason to think of gastric cancer in the case. There have been no gastric symptoms, no vomiting until the last few weeks, and there is no tumor of the stomach to be found. Besides, the improvement of our patient, until now she is once more able to take mixed food by the mouth, speaks against this. It is true that small cancerous nodules of the stomach wall are sometimes so situated as to be beyond the reach of the most careful palpation, and may give absolutely no local symptoms until very late in the course of the affection, while sometimes they present a most deceitful history of amelioration and regression of symptoms.

We cannot, even in a case like this, be absolutely sure that we will not find at the autopsy a cancer nodule in the stomach. In cancer of the stomach, we sometimes find the jugular glands here behind the clavicle enlarged; and there is in this position at least one suspicious body that would seem to be an infiltrated gland. The search for these glands is important, as it is in cancer of the cardia and the lesser curvature, which are usually beyond the reach of palpation, that they are especially liable to enlarge early.

After gastric cancer, cancer of the liver is most frequently secondary to cancer of the gall-bladder or the gall-ducts. This is probably the case here, since the complete shutting off of the bile from the intestine points to an affection of the principal bile-ducts themselves. The tumor we have found might be due to an enlarged gall-bladder, but enlargement of the gall-bladder would not cause icterus; even obliteration of its cavity by the neoplastic growth would not interfere with the flow of bile. It has been demonstrated by experiment on animals that the gall-bladder may be dispensed with without causing serious inconvenience, and surgeons have removed it from human beings without the development of any post-operative biliary complications.

If the neoplasm were situated in the bile-ducts, we can easily understand how it would interfere with the flow of bile. A ring of cancerous tissue in the ductus choledochos communis would in a very short time occlude its lumen, which is normally much smaller than is imagined, and so give the intense icterus and absolutely bileless stools we have in this case. Usually, cancers of the gall-bladder or gall ducts develop in the midst of scar-tissue which has resulted from the presence or the passage of a gall-stone. Of any such event in this case we have absolutely no history; there has been no colic, no pain of any kind; only in the last few weeks a somewhat painful sense of pressure and tension in the liver region. This sensation is common enough in cancer of the liver, and seems to be due only to the increase in size of the organ causing real pressure on surrounding tissues.

The general condition of our patient, the cachexia, and her age almost assure the diagnosis of cancer. It may be just possible, however, that this cancer exists in the head of the pancreas. The common bile-duct runs around this on its way from the liver to the intestine, or at times passes through a tunnel that is made for it

through pancreatic substance itself. Cancer here, then, might easily compress the gall-ducts and give us the biliary symptoms. Besides, cancer of the pancreas often causes the rapid development of cachexia, such as has been noted in this case; and its proximity to the stomach might easily have set up the gastric reflexes, which culminated in the acute continuous emesis that brought her to the hospital. This would leave the irregular enlargement of the liver itself unexplained; and a tumor here in the region where tumors of the head of the pancreas should be palpable between the ensiform and the umbilicus is not to be felt.

Our diagnosis, cancer of the liver secondary to cancer of the gall-ducts, is at best, however, only a reasonably supported probability. We must discuss, then, the other possibilities of the case. It is so easy to miss a link in the chain of reasoning or connect wrong links together, that it is sometimes a matter of not much surprise that the autopsy does not confirm the diagnosis.

Despite the absence of all acute symptoms, especially of all pain, there is still the possibility that we have here a case of cholelithiasis, —the enlargement of the liver due to active congestion and backing up of bile, and the tumor being the distended gall-bladder, or that organ filled with calculi; but it is but a bare possibility against which the cachexia and the afebrile course of the case are almost conclusive.

Our patient has had round worms for a long time, and the parasites have been inclined to wander, even having been vomited from the stomach. Round worms have been known to find their way into the common bile-duct, and either because overcome by the concentrated bile that the irritation of their presence had caused to flow, or imprisoned by a spasm of the duct, have been unable to find their way out again. Their bodies block the duct and cause jaundice and bileless stools. Usually, the bacteria carried up by them from the intestine set up inflammatory processes that further occlude the lumen of the ducts, and an acute interstitial hepatitis, abscess of the liver, may result. We have no symptoms of abscess here. Instead of an acute, we may have had a chronic inflammatory process; hence the uneven feel of the liver, the distended gall-bladder, causing the principal prominence of the tumor. In these cases, however, there is first colicky pains from the occurrence of spasm of the gall-ducts, and then later fever intervenes from the infective processes set up in the liver. We have had neither of these in this case.

Finally, the possibility of the condition being an ordinary catarrhal jaundice cannot absolutely be excluded. Two months is rather long for catarrhal jaundice to last, but, still, not unheard of. The sudden onset of the jaundice resembles the beginning of catarrhal jaundice, and it may have just such a febrile course. In that case, however, the tumor and the cachexia would have to be explained on the score of the existence of a malignant neoplasm, either of the liver itself or of the stomach. After all, it is to be always borne in mind, in such cases, that even the most serious and striking symptoms may not all be due to the same cause, and that when a serious ailment is in progress a slight complication or an unimportant intercurrent affection may give symptoms which, of course, the medical man will try to connect with the principal ailment, though they absolutely lack such connection.

As to the ultimate prognosis of the case, it is absolutely unfavorable, of course, as we are forced to the conclusion that a neoplasm is at work, and there is no question of operative interference. As to immediate prognosis, that, too, is bad. Her generally weak condition and her atrophic heart indicate that a fatal collapse may ensue almost at any time. Her death will probably be due, under the circumstances, immediately to heart-failure.

As to treatment, that, of course, can be only symptomatic. Fortunately, now that we have overcome the tendency to the rejection of food, there are not many symptoms to be treated. Despite the intense jaundice, there has never been the itchiness that is so bitterly complained of often in these cases. I have seen patients tear themselves with their nails to relieve their feelings, and even cut themselves, preferring to bear the pain to standing the awful, persistent pruritus, without relief or intermission. Such cases very often are extremely hard to treat satisfactorily. There are not many other symptoms from the jaundice. The patellar reflexes are very weak, nervous conduction being rendered difficult by the presence of bile in the nerve-tissues. The sensorium is perfectly free, so that brain tissue has not suffered much. Xanthopsia, yellow vision, though often looked for and said by some to occur, does not occur in jaundice. The sweat has been yellow from the presence of bile, but is now clear again. Mucous secretions are always secreted untinged, but sometimes take up bile-coloring matters afterwards. Pathological exudates, as the exudate of pneumonia, are always

yellowish in color. All this gives very little indication for treatment.

The dropsy in the case may be due partly to cachectic exudation; that is, to the hydræmic condition of the blood and the tendency of its fluids in these conditions to find their way into the areolar tissue; or it may be due to heart weakness with congestion of peripheral circulation. Cancers of the liver often cause pressure upon the vena cava, either directly of themselves or by infiltration of the retroperitoneal glands which lie near the vena cava. Sometimes the cancerous glands may acquire adhesions to the vein and be found at autopsy extending into the lumen of the vessel. Then, of course, the backing up of blood causes the œdema. Here this œdematous and dropsical condition is scarcely enough to demand treatment. It would be scarcely safe to stimulate the weakened, atrophic heart, and for the tumor itself we can do nothing. The two symptoms that required treatment—the vomiting and painful sense of pressure in the liver region—we have succeeded in relieving. We can only treat other symptoms as they may arise, and make life as bearable as possible until the inevitable ends the scene.

Neurology.

CEREBRAL APOPLEXY.[1]

CLINICAL LECTURE DELIVERED AT THE UNIVERSITY OF BERLIN.

BY PROFESSOR EMANUEL MENDEL, M.D.,

Professor of Diseases of the Nervous System and of Psychiatry at the University of Berlin, Germany.

GENTLEMEN,—Preliminary to our clinic on "cerebral apoplexy" to-day, I showed you yesterday a patient who came for the first time to the policlinic with many of the characteristic premonitory symptoms of apoplexy. You may remember he was a man of fifty-one, who came complaining of frequent, almost persistent headache, and who had peculiar sensations in the fingers of his left hand,—creepy feelings, sensations as of pins and needles, and as if his fingers were asleep; in a word, the group of symptoms we know as paræsthesiæ. His radial arteries were thick, somewhat unyielding, and slightly tortuous. His temporal arteries were prominent, easily visible, distinctly thickened, and tortuous. There was evidently the general arterial condition which the English authors, Gull and Sutton, described as arteriosclerosis. This same degenerated condition of his arteries exists within the skull, and by lessening the elasticity of the arteries interferes with the proper nutrition of the brain, besides rendering them always liable to rupture when for any reason there is an increase of blood-pressure.

It is the interference with the processes of cerebral nutrition which gives rise to the paræsthesiæ and to the headache. The localization symptoms point to the region where the cerebral arteries are most affected, and give us an almost infallible indication of where the paralysis will come when the rupture of the weakened artery

[1] Reported by James J. Walsh, Ph.D., M.D.

actually occurs. To-day I have a very similar case to show you, but with an additional feature of interest. The patient is sixty-two, and complains of headache and dizziness. When he stoops over and then straightens up everything becomes black before him; he must immediately take hold of something to keep from falling. His radial arteries, too, are thickened and lengthened, his temporal arteries, as you see, are distinctly tortuous and prominent above the skin. Here we evidently have a condition interfering with brain circulation, so that there is not the compensatory elasticity present in the arteries which is necessary to overcome the rapid variations of the influence of gravity on the blood-stream when there are sudden unusual changes of position.

The dizziness may be the consequence of Ménière's disease, which develops often about the same age and from a corresponding condition of arteries, which is, in fact, often the result of an apoplexia sanguinia, not cerebralis, but into the semicircular canals. Ear symptoms should always be looked for then, and in case of doubt a cerebral otological examination should be made by an expert. At the same time it must be remembered that ear symptoms—ringing in the ears, decrease of hearing power—are themselves often the premonitory symptoms of cerebral apoplexy. These premonitory symptoms—headache, dizziness, loss of or lapses of memory, feeling of intellectual incompetence, with the paræsthesiæ mentioned—will be found in the history of nearly every case of apoplexy. I have some apoplectic patients here to-day, and will demonstrate this to you in the history of the case.

Here is a man of fifty-seven, who had his attack three years ago after a coughing spell. He had had some headache and peculiar feelings in the fingers of his left hand before the attack.

Here is a man of seventy-two,—attack one year ago,—who had attacks of dizziness, especially when he stooped, as, for example, to tie his shoes.

Here is a patient who said at first that he noticed nothing before his attack; that he was perfectly well beforehand; yet a little further inquiry elicited a very different story. He had had headaches occasionally before his attacks, had had fits of dizziness upon rising in the morning, and recalls that his fingers and his left foot often went to sleep if not moved for some time. This will be a common experience for you with a certain class of patients. They have had certain

symptoms, but their attention was so little fixed by them that they have lost the recollection of them until they are explicitly recalled to them by detailed questioning.

Here is a woman of forty-nine, who had strange feelings in the fingers of her right hand and had become awkward in buttoning her dress. You will often have your male patients complain of the difficulty they find in buttoning their collars.

Here is a man of fifty-one, who occasionally found his left arm weak for months before his stroke, and whose left leg felt heavy and had a tendency to drag at the same time. Such cases are not rare, and it is probable that in them we have not so much to do with preliminary or premonitory symptoms as with actual slight apoplexies, small hemorrhages into the brain, not causing many secondary symptoms and gradually reabsorbed.

Here is a man of fifty-eight, who, after having had a number of attacks of dizziness in the morning immediately after rising, one morning had his stroke. The case is typical of a series of cases that occur, and illustrate the fact that the difference in blood-pressure—even so slight a one as that occasioned by the change from the lying to the sitting or standing posture—is enough to be a causal factor in the arterial rupture and consequent hemorrhage.

Here is a woman of fifty-five, whose friends noticed a change of disposition in her before her stroke, and who complained herself of not feeling right, of not being herself, feeling stupid, of losing her memory, especially for recent happenings. This psychical symptom-complex is not an unusual premonitory sign in apoplectic patients, and when accompanied by the physical signs of degenerated peripheral arteries, should always awaken suspicion.

And so we might go on. Occasionally a patient turns up who has had no premonitory symptoms, but it is a rare exception. This pre-apoplectic stage is an important one for the physician, for it is at this time, not during or after the attack, that therapeutics can accomplish anything That rational therapy can do a good deal in at least delaying a threatened apoplexy, if the early premonitory symptoms are heeded and the indications met, my large personal experience of such cases has convinced me. It is not a little gain if the stroke can be averted for a year or more, perhaps, for we can never tell how serious it will be when it comes, or whether it may not be almost immediately fatal or leave most serious sequelæ.

Patients with these symptoms should, as a rule, be frankly told what is imminent. In certain nervous, excitable people it will not do to use the dread word apoplexy, nor to give them all the details of the threatened danger, but they must be given a clear idea of their condition. Emotion and worry are two things they must avoid, so that perfect frankness, for the purpose of securing their co-operation in prophylaxis, would sometimes defeat its object and have just the opposite effect.

As far as possible all sudden or great emotions—in fact, emotions of any kind—must be avoided by such people. They cause sudden variations in blood-pressure which are ruinous to the decreased elasticity of the arteries. Anger and grief, especially the sudden announcement of bad news, are often the immediate cause of apoplexy, and must be avoided. The excitement of coitus has been known to be the immediately exciting cause, and patients must be warned of this danger. All heart stimulants must be avoided, coffee, tea, and alcohol, the last especially. Tobacco undoubtedly tends to produce myocarditic degeneration and degeneration of the arterial walls, so that it must be avoided. Overeating is often a source of cerebral congestion, and, in general, high living without sufficient exercise causes a plethoric fulness of the circulation that must be avoided. On the other hand, the indulgence in violent effort of any kind, running, especially up-stairs or up-hill, heavy lifting, straining at stool, may cause the alteration in blood-pressure which immediately precedes arterial rupture. In general, the manner of life must be a quiet, easy one, without excitement, without over-indulgence of any kind, with regular, gentle exercise in a mild, equable climate if possible.

Two drugs have in my hands seemed to do good service in these cases,—the iodide of sodium and ergotin. The iodides undoubtedly to my mind lessen the interstitial changes in the arteries, when they have not gone on to the stage of actual degeneration. They restore some of the elasticity to the arteries, by lessening the chronic inflammatory changes which interfere with the normal action of the muscular coat. I am sure that I have felt arteries grow softer under my finger from month to month, under the use of the iodides, where there was a distinct arteriosclerosis in its not advanced stages. The accentuated second aortic sound in such cases became less noticeable, the general condition distinctly improved.

Ergotin seems to act by decreasing blood-pressure, but without

depression. It may be continued, with intermissions of a week every month and a month in six months, for years without unpleasant side effects, and without the system becoming so accustomed to it that it fails of its desired effect.

A word must be said here of very early prophylaxis for apoplexy. Heredity certainly plays a *rôle* in certain families. At a certain age members of such families are liable to a stroke. The embryonic material originally furnished for their arterial system is able to stand the ordinary wear and tear of life for a certain length of time, and then it gives out. Such people should be persuaded early in life that they must save as much of the arterial wear and tear of life as possible. The excitements of life, the occasions of intense emotions, violent or prolonged exercise, and exposure to extremes of heat and cold they must avoid; stimulants and tobacco they must deny themselves. Personally, I am convinced that excessive smoking is an important causal factor in many cases of arteriosclerosis. Such patients must, in a word, be satisfied to live the tranquil lives of people for whom many of the pleasures and ambitions of life are closed books.

Such people are often of short stature, of full habit, with short, thick necks and flushed faces, and this condition has been called the habitus apoplecticus. It is clear to me that this class of people, even where heredity plays no *rôle*, are more liable than others to apoplectic attacks. Most of these prophylactic measures apply to them, then, at all times, and premonitory symptoms should be watched for carefully to secure early the exact precautions necessary.

Of course, patients will often not be willing to follow your directions, and sacrifice so much of the pleasures and ambitions of life, merely because of some of the early preliminary symptoms or because there is a predisposition, hereditary or acquired, in their case to apoplexy, but you must fulfil your duty in the matter of plain warning. Sometimes you will find them not ready to follow directions, even when the symptoms are immediately threatening.

I have at present a doctor under my care (though doctors, of course, as an almost invariable rule, make the worst possible patients and so, perhaps, it is not to be wondered at), who must have realized as well as I did myself the significance of certain symptoms of which he came complaining some three months ago. He absolutely refused to give up his work, though it was possible for him to do so, and contented himself with the limitation of it. He soon overstepped these

limits, as you can easily imagine, and then the apoplexy came, fortunately not very severe.

Very often in such cases the cerebral hemorrhage occurs in the street or in a crowded hall or theatre, and the patient is treated most unsuitably. He is left lying flat, as if he had fainted and the sending of blood to his brain would be good for him. He is moved and carried roughly, so as to favor the hemorrhage, or before the doctor comes stimulants are forced down his throat with the idea of reviving him. Patients should be warned, then, about going out alone, and friends and attendants should be told what is the most suitable thing to do in case anything happens. Rest in a sitting posture, no sudden rough movements, but calm waiting until suitable arrangements for the gentle movement of the patient are possible.

We have spoken of the preliminary stage. Now as to the attack itself. Very little can be done beyond the rest in the sitting position, with an ice-bag on the head; venesection, of course, if the pulse is high and bounding, but not if it is weak. Injections of ergotin have seemed to me to stop the further progress of the bleeding. The differentiation of cerebral hemorrhage from other comatose states, notably alcoholic intoxication and renal or diabetic coma, is often extremely difficult, and the diagnosis must be carefully made from the circumstances of the case, the odor of the breath, alcoholic, urinous, or sweetish, and from the examination of the urine and the vomit. The number of mistakes that have been made in this matter is a warning to draw no hasty conclusions.

The conditions that develop after the apoplexy can be best judged from the dozen or more of cases we have before us this evening. Some of them you have already seen; the others I shall have walk here before you now. In nearly all the cases there is the same clinical picture, and when we complete this picture by the anamnestic details the patients give us, the similarity becomes even more striking. In all after "the stroke" there was paralysis or, at least, paresis of one side. In some of them this has almost entirely disappeared. In some contractures of muscles have come on, in others, as in this old man, a fine tremor has developed in the members that were paralyzed.

This clinical similarity in apoplectic cases was remarked by Hippocrates, and later by Galen, whose attention seems to have been given to evolving some explanation of it. Centuries afterwards, when modern scientific medicine was just beginning, Morgagni's

demand as to why this same set of symptoms should always be found in apoplectic cases set people thinking as to what might be its cause.

The explanation is, of course, easy for us who know the pathological anatomy of the cases. It is that in eighty-five to ninety per cent. of the cases the lesion is found in just the same place in the brain. It occurs with about equal frequency on either side, but is practically always situated in the region of the large ganglia at the base of the brain, and oftenest in the internal capsule. It is here that are gathered the motor fibres of the corona radiata as they pass down from the motor cortical centres, to traverse the cerebral peduncle and the pons to meet the peripheral neurons of the cord. It is the interference with the function of these motor fibres that causes the hemiplegia.

The hemorrhage—for it is hemorrhage that is the lesion in these cases—need not necessarily be limited to this region. In the form known as apoplexia progressiva, or ingravescens, the hemorrhage takes place first into the brain substance, then by destruction of nervous tissue works its way into the ventricles, from whence through the foramen of Magendi it finds its way into the arachnoid space. Additional symptoms besides the coma and the hemiplegia occur in these cases, the most characteristic of which are convulsions or convulsive twitchings and a febrile temperature.

The hemorrhage in most cases takes place from a definite artery, the lenticulo-striate branch of the middle cerebral or Sylvian artery, which has been called by Charcot for that reason the artery of arterial hemorrhage. Increase of blood-pressure alone is not enough to cause an artery to burst, even in the brain, where it is unsupported by firm surrounding tissues. I have subjected the arteries of dogs' brains to more than double the usual pressure, but without causing rupture. The arteries must be diseased. The principal cause of arterial degeneration is undoubtedly senile change, but alcoholism, gout, syphilis, lead, and various intoxications, and arteriosclerosis play an important *rôle*.

With diseased arteries the reason why this special branch should be more subject to rupture than others is not hard to find. It is much more directly connected with the carotid than are others,—*i.e.*, the course of the blood to it is more a straight line, and it is much more liable to the effects of changes of intra-arterial blood-pressure than the others. Other arteries here at the base of the brain (arteriover-

tebralis basilaris) are more curved, and it is a well-known principle in physics, taken advantage of in the manufacture of manometers, pressure-gauges, etc., that an increase of pressure within a bent tube tends first of all to straighten the tube, as the liquid would thus have more room. Blood-pressure in the other arteries, then, first exerts itself in straightening out the arteries, and so some of its destructive force is lost.

The rupture usually takes place in the arteries of the white matter, not those of the gray, for anatomical reasons. In the gray matter there exists an anastomosing net-work of fine arteries which tend to conduct away the blood and relieve increased pressure. In the white matter the arteries branch dichotomously,—*i.e.*, each branch divides in two,—have very few intercommunications, and are terminal arteries—that is, do not end in an anastomosing arterial net-work, but are joined directly to the capillary system. I have proved by experiment that blood-pressure was higher in these terminal arteries of the white matter than in the arterial net-work of the gray matter.

At the point where rupture finally takes place there is a degeneration of the coats of the artery, which leads to their yielding with the production of what Virchow called ampullar ectasiæ, and what Charcot afterwards called miliary aneurisms. The media atrophies, the intima and adventitia yield. Sometimes a periarteritis would seem to be responsible for this aneurismal condition which practically always precedes apoplexy.

When the hemorrhages are small, degenerative changes soon occur in the exuded blood. The bluish-red color changes to chocolate, then to a yellowish red, and in the detritus that remains fat-globules, pigment granules, and hæmatoidin crystals may be found microscopically. These regressive changes take about three or four weeks. The presence of the blood in the nerve-tissues is a source of irritation which gives rise to chronic inflammation. During the inflammatory process connective tissue is formed around the remains of the hemorrhage, and, as the process of absorption still goes on, a cavity with discolored walls filled with a watery serous fluid is all that remains. These are the so-called post-hemorrhagic cysts which constitute the gross morbid anatomical lesion of an old apoplexy, and demonstrate very clearly its localization.

The symptoms that we observe in a case of apoplexy are not alone those of the actual hemorrhagic lesion itself and of the interruption

of nerve-impulses or nervous conduction that it occasions. The sudden unconsciousness is probably due to two factors,—the increased intracranial pressure and the interference with the circulation and the œdema consequent upon it. These two factors, moreover, cause interference with other brain functions that are not immediately affected by the hemorrhage itself. Besides, there is often slight inflammatory reaction around the hemorrhage from the irritative presence of the foreign material.

We have to distinguish two classes of symptoms in apoplexy,—direct and indirect. The indirect symptoms, among which may be classed especially (though not always) unconsciousness and aphasia, usually disappear in the course of a few hours or a few days, though, of course, they may last longer and in severe cases consciousness is not regained. The direct symptoms disappear more slowly, and complete restoration of function is rather the exception.

This brings us to the prognosis of "a stroke" of an apoplexy. During the first few hours we can tell absolutely nothing. Even when there have been no premonitory symptoms, and the symptoms do not seem threatening, the lesion may nevertheless prove to be progressive and have a fatal issue. During the first few days after the attack we can only judge in general of what improvement may be hoped for by the rapidity of recovery thus far. At the end of about two weeks there occur certain symptoms which enable us to judge with reasonable certainty whether the recovery will be complete or not,—*i.e.*, whether good use of the hemiplegic limbs will be regained.

Some days after the stroke a contracture of the muscles of the hemiplegic side sets in. It is due to the irritative inflammatory reaction around the nerve-fibres from the motor cortical centres, and has no prognostic significance. This early contracture usually passes off again after a few days. From fourteen to twenty days after the stroke the state of permanent contracture, which is of bad prognosis, begins to show itself. If after fourteen days the patellar and other tendon reflexes are too lively, it is a bad omen. Permanent contracture will almost inevitably set in here, though it will not be fully developed for from six to eight weeks.

Onimus pointed out that the occurrence of sympathetic involuntary movements in the affected limbs when the unaffected limbs were moved was of bad prognosis, and this has been confirmed by further experience.

I shall show you here this condition of post-hemiplegic contracture. Here is a patient fifty-eight years of age, who had his stroke fourteen years ago, and you see how his arm is held close up against his side in adduction, flexion, and partial supination. The fingers are partly bent and the thumb is carried into the palm of the hand. It is a true spastic contraction, not one set of muscles alone being affected, but both groups, the flexors and extensors being in a state of irritative spasm. The leg is in typical extension contracture, the powerful extensor muscles keeping it absolutely rigid.

Of course, all the reflexes are increased and ankle clonus exists. Here I can get jaw clonus by tapping the chin, and each of the tendons in the arm gives a lively reflex. In most of the cases of apoplexy the leg improves sooner and better than the arm. The contracture that develops in the arm is often, as in the two cases I now show you, very marked, and makes the member practically useless, ever glued to the side and with atrophy ever getting worse from complete inactivity.

The cause of this contracture and of the post-hemiplegic tremor that develops at times along with it has been the subject of a good deal of discussion and the origin of a number of theories. Todd considered it due to a chronic encephalitis, but the localization to the cerebrum is not necessary, as it may develop after injury to the pyramidal tracts any place in their course. Hitzig explained it from the sympathetic associated movements of the affected side, which always occur, though it may be insensibly. In a member in which inhibition is lowered so much a state of spasm—*i.e.*, a continuous involuntary muscular contraction—develops. Charcot considered it due to heightened tone of the muscles, the fibres of the pyramidal tract through which inhibitory will impulses are carried to the muscles having degenerated. While the secondary degeneration of the pyramidal tracts exists in these cases, it is by no means clear that it is the causal element in the case.

The treatment of these contractures is not very satisfactory. I have sometimes found good result, I thought, from the use of ergotin and nitrate of silver. Galvanic electric currents weak in strength seem to do good. Of course, these measures must not be employed during the early irritative stage, and the same thing holds for baths, massage, and passive movements. Cold baths should not be given, as the contraction of surface arterioles leads to increase of blood-

pressure, and this may cause renewed hemorrhage or bleeding from another spot, as the artery is degenerated and aneurismal in more places than one, as we have said. Passive movements frequently during the day and the use of light splints during the night will often keep contractures that would leave the limb in a useless position from developing.

Some of the other symptoms seen in hemiplegic cases are interesting, and I shall call your attention to them as the patients are here. Here is a recent case: The stroke occurred but three weeks ago, and the hemiplegia is quite noticeable, though gradually disappearing. You notice when I ask him to smile there is a contortion and the mouth is drawn to one side, yet he closes the eye on the affected side completely, and he wrinkles his forehead perfectly naturally. A week ago I showed you some peripheral facialis cases, and in these the branches to the musculus frontalis, to the corrugator supercilii, and to the orbicularis palpebrarum were affected. This sparing of the uppermost branches of the facialis is characteristic of a cerebral lesion. Just why it occurs is not so clear, probably because there are separate centres for the upper and lower parts of the face, though it may be that the other hemisphere is capable of supplying nerve-impulses when one is shut off, it being thought by some that these parts have a double central representation in the brain.

Here is a case that occurred two months ago, in which there is distinct paresis on the affected side, but also not normal power on what should be the well side. You will often find this. It is due to the fact that part of the pyramidal tract fibres do not cross to the other side, but traverse the cord on the same side as the side of the brain from which they originate. This uncrossed pyramidal tract will be found degenerated in the anterior columns when secondary degeneration has taken place. In some people the crossing of the pyramids is complete, and a lesion in such cases will not cause paresis on the other side. In other people very little of the pyramidal fibres cross, and so is, perhaps, best explained in the cases where a lesion of the brain causes paralysis on the same side of the body instead of the opposite side, as is usual.

Here is a case where there has already been three strokes. It is a popular saying that the third stroke is always fatal; as you see, this is not always true. I have had patients who have had five or more strokes. Naturally the prognosis grows worse with each one,

as it becomes clearer that the arteries are too degenerate to contain the blood under the slightest increase of pressure.

It will be readily understood that such people must be warned to be most circumspect in their mode of life, to avoid emotion and excitement, to drop ambition, to avoid excess in eating and the eating of unsuitable food, to keep their bowels open, to avoid straining at stool, to avoid sexual intercourse, or any unusual physical effort, for the slightest rise in blood-pressure may cause hemorrhage with a fatal termination.

INTRACRANIAL GUMMA IN THE FRONTAL REGION.[1]

CLINICAL LECTURE DELIVERED IN THE GERMAN UNIVERSITY AT PRAGUE.

BY PROFESSOR ARNOLD PICK,

Director of the Klinik for Psychiatry and Professor of Mental and Nervous Diseases in the University.

GENTLEMEN,—The case that I present to you to-day has been with us since the end of November. I meant to have brought her before you while her affection was at its height, in the early days of December, but the long vacation necessitated by the circumstances that surround us precluded this, and now I show her to you in a state of health. Her case is a most interesting one, and that must be my excuse for presenting her in practically a normal condition.

She is fifty-three years of age, and the wife of a messenger. There seems to be no history of previous illness. She was married at twenty-seven, and is the mother of thirteen children. She had one abortion and one miscarriage. Six of her children are alive, and all are healthy, except one son, who had, it would seem, his first attack of epilepsy only a few weeks ago, although he is now past eighteen. The other children died in childhood, of illnesses that do not seem to throw any light on the case. One of them, however, a boy, used to have attacks which were evidently epileptic, from the description of them.

I may as well say here that, owing to the nature of the case, careful inquiry was made for anything in the personal or family history which would throw any light on the question of syphilitic infection. We did not elicit any very satisfactory information, though the general family history is, as you see, a little suspicious. Careful questioning caused the husband to confess that he had, during the time of his military service, a sore on the genitals, which healed in four-

[1] Reported by James J. Walsh, Ph.D., M.D.

teen days under applications of gray salve. He never had any other affection or any other symptoms, and his wife never had any.

Three years ago our patient began to see very poorly; but this seems to be nothing more than the usual senile presbyopia, developing here a little precociously.

A year ago, symptoms of the climacteric came on. Her menstruation became irregular, and at times very profuse. For this she was under a doctor's care, and seems to have been benefited. Headaches became very frequent about the time that her menstrual troubles set in, but did not leave her when they ceased. On the contrary, they became worse and more persistent, especially at night, when they were almost unbearable. For more than nine months now she has had continuous headache, localized in the right temporal region, but no other symptoms, except that her daughter thinks she noticed, about three weeks before her mother was brought to us, that when she talked or laughed one side of her face did not share completely in the expression. Her left facialis was evidently affected, and after a time she began to complain of pain in her left leg and to drag it when she walked. Then paresis of the left arm developed, accompanied by a slight tremor. Meantime she complained of paræsthesiæ in the affected extremities, especially in the legs.

The striking symptoms of her affection were the mental changes which developed, and for which she was brought to us. Two or three days after her left-sided paresis she became very restless, and then obscene and indecent in her language. In the midst of her complaints she would break out with snatches from a drinking song. She complained of intense headache in the right temporal region. This became so bad that it was almost unbearable, and she wrung her hands and tossed incessantly about, begging piteously for some relief. Her head was very tender to percussion, especially on the right side.

She had left-sided hemiparesis, with all three branches of the facial on the left side affected, but without any objective disturbances of sensation, except that she could not shut her eye completely. Very little force was required to overcome the resistance of the orbicularis and open it while she tried to hold it shut. She was able to wrinkle her forehead but very little on this side, distinctly less than on the right side. The nasolabial folds on the left side were less pronounced than on the right, and when contracted in pain there was

distinctly less expression on this side than on the other. The left arm was weak; the left leg was distinctly paretic, and when she walked she swung it in the arc of a circle, in the way so characteristic of hemiplegics.

Both her patellar reflexes were increased, and ankle-clonus was present on both sides. Examination of the eye-grounds showed choked disk on both sides, and consequent reduction in the acuity of vision. Her hearing was normal. Examination of her ears disclosed nothing anomalous. Her urine was normal.

She was very restless, did not sleep at night, and was continually wanting to see the doctor. Her obscene remarks continued. She talked to patients and nurses and doctors on sexual subjects, and made remarks about male genitals almost persistently. Beyond this her variable disposition, now singing and gay, now sad and complaining, was very striking.

On the second day after her admission she had left abducens palsy, with pronounced strabismus inward. Then variations in the intensity of her facial paralysis were noted, and now one and now another branch was more or less affected than had been previously the case. The headache persistently remained. Occasionally there was vomiting even in the mornings on an empty stomach. When she came into the hospital her pulse was ninety-eight; but this seemed to be due to the excitement incident to being brought to the hospital rather than to any physical abnormality or condition. It came down in the course of the next day or two to sixty-eight, and stayed there. We could scarcely consider, however, that this was a symptomatic bradycardia, for she seems a rather phlegmatic peasant woman, and this is probably about her normal pulse-rate.

At times she was lethargic and sleepy, but oftener restless, frequently calling for the attendants and the doctors, and nearly always in an obscene manner. The symptoms were such as to make us suspect syphilis; in fact, consider it probable; and so we began specific treatment. She was given one-half gramme, or eight grains, of sodium iodide three times a day, and a course of mercurial inunctions, about four grammes (drachm i) being rubbed into different parts of the body each day.

On November 30 she complained of neuralgic pain under her left eye, especially intense near the suborbital foramen. The middle (superior maxillary) branch of the fifth nerve was evidently involved

in the pathological process, whatever its nature. Careful examination of the condition of her sensibility now showed that there was hypalgesia of the whole of her left side; even the plantar reflex (sensory) on her left being weaker than on the other side. On the right, on the contrary, there was distinct hyperalgesia.

On December 2 there was pronounced strabismus convergens sinistra; but it was only a passing phenomenon, and was almost entirely gone again in a few days. Then improvement set in, and in a week all the symptoms were noticeably better. On December 9 the facialis paralysis was almost entirely gone, and the anomalies of sensation had disappeared. On the 12th she walked better, and on the 14th all the somatic symptoms were improved; there had been no psychical symptoms for over a week, and the choked disks had distinctly retrograded. On December 31 the edge of the papilla was once more well defined, and only slight traces of the congestive condition of the end of the optic nerve remained.

Now, a week later, she is practically entirely well. There is still slight convergent strabismus of the left eye; but when we were examining her only this morning and calling special attention to this, she assured us that she had always been slightly cross-eyed in this eye. I call your attention to it in order to impress upon you the importance of knowing the details of your patient's ordinary condition before judging of the presence or absence of such symptoms as strabismus.

There is no paresis left now. She laughs naturally, closes her eye well, and keeps it closed despite attempts to open it, and her nasolabial folds are symmetrical. There is no weakness of her arm and leg, and when I tell her to walk you see no sign of paresis. She even runs, to show you how well she is. Her knee reflexes are still lively, but not nearly so exaggerated as before, and her ankle-clonus has disappeared. Her mental condition is very satisfactory. She is still free in her talk, as many women of her class are, especially with doctors, but she is not as obscene as she was. All her symptoms are gone, psychic as well as somatic.

Now comes the interesing question, What have we had to deal with? The general symptoms are very significant. The intense, persistent headache, the tenderness to percussion on the right side of the skull, the double choked disk, and the vomiting without any digestive disturbance to account for it, all point very clearly to brain

tumor. The slow progressive character of the symptoms points also to tumor. The almost pathognomonic sign is the choked disks. They occur almost without exception at some period in the development of a brain tumor, and, what is perhaps more important, fully ninety per cent. of choked disks are due to brain tumor. The two things are almost absolutely correlative.

It is true choked disk may exceptionally occur in certain intoxications, as in lead poisoning, for example. It has been noted, too, in grave anæmia, but these are things that may be rather easily excluded by the appearance and history of the patient. In abscess, though here, of course, one is invading the bounds of what may not improperly be included under the general term tumor, choked disk is not infrequent. In our case here we have not, however, the slightest reason to think of abscess. No acute infection and no purulent process preceded the present affection, so that there was nothing to occasion abscess, and the whole course of the case has been an afebrile one.

As to the nature of the tumor, we have two signifiant indications, but they do not entirely remove all doubt. The anamnesis might easily be construed into a conjugal syphilitic infection, though it must be confessed that it is lacking in most points of what might be called a typical syphilitic history. Partly because of the possibility of syphilis, and partly because, in any case where brain tumor is diagnosed, it is prudent to give syphilitic treatment, we have a positive therapeutic test. This does not, however, put the question of the nature of the tumor beyond all doubt; for there are a number of cases in which the administration of the iodides has caused the disappearance of the symptoms of brain tumor, and yet afterwards the autopsy has shown that there was question not of a gumma, but of another form of brain tumor.

These cases are, however, the exceptions that prove the rule, and it is extremely probable that here we had to do with a gumma. With the symptoms to guide us for its localization, where did this gumma have its seat? As all three of the branches of the facialis were involved, the musculus frontalis, the corrugator supercilii, and the orbicularis not being spared, as is usual in lesions of the cerebral hemispheres, we at once think of a lesion in the pons. Usually, however, such a lesion of the pons is accompanied by alternate paralysis, —*i.e.*, paralysis of the facialis on the side of the lesion and of the leg

and arm on the opposite side. A pontile lesion usually affects the facialis after its decussation, which takes place in the upper or capital part of the pons, while it affects the motor tracts before their decussation, which takes place in the medulla.

We might think of a lesion in the upper—*i.e.*, more central—part of the pons, at a point where the facialis fibres had not as yet crossed to the other side, and where, as a consequence, facialis fibres and motor fibres for the extremities lie on the same side. The paralysis would then be of the cortical type, and affect the opposite side of the body and face, but there would still remain the abducens paralysis to explain. If the tumor were in the right side of the pons, we should expect the right abducens to be affected; for it is in its course around the pons from its origin in the floor of the fourth ventricle that the presence of a tumor would affect its function. We might take refuge in the suggestion that the tumor was a branching gumma (not so unusual a find, after all), an extremity of which affected the delicate abducens at some part of its long course without interfering with other pontile functions; or we might think of several gummata.

There are a number of serious objections to such an explanation, however. This does not explain the disturbances of sensation or the psychical symptoms. Besides, the headache had been coming on for some time, and the choked disks show that the process is not a recent one. Hence the tumor must needs be of good size, and a large tumor here would not remain so long comparatively latent. The pons is too narrow a pathway, and the intricate meshwork of its fibres too delicate a mechanism for such latency.

It might be objected to this that quite large tumors have been found post mortem in the pons, which had remained absolutely latent, and had not given a single symptom. But these were usually solitary tubercles of extremely slow growth, or gliomata taking years for their development, and gradually pushing nerve-tracts out of the way in the course of their growth, but by such imperceptible degrees that even delicate nerve-fibres learned to accommodate themselves to the situation. For a gumma, however, which is of comparatively rapid growth, such a symptomless course is not at all probable.

Where else, then, might the tumor be situated? The hemiplegia points to the motor regions, but yet not directly here, since complete palsy of one member and paresis of other parts did not exist, but a hemiparesis. The lesion, if cortical, was in the neighborhood of, but

not in, the motor centres. The gradual development of the paresis spoke, also, for such a localization. The psychical symptoms, the very gradual development, the location of the headache, and the tenderness to percussion point to the frontal convolutions. The last two points put the lesion on the right side. From here pressure was exerted upon the motor centres lying just behind and through the brain upon the seventh nerve at the base.

Why this pressure did not make itself felt more on the right than on the left, at the base, is not clear; but similar cases have been reported before. Not long ago, Mauthner reported a case where two small tumors on the convexity on one side affected certain nerves at the base on the other side. Some time ago, too, Nothnagel reported a case of a tumor of the cortex producing pressure symptoms on basal nerves on the opposite side, the sixth, the abducens, being principally affected.

Besides the sixth, in our case, the fifth on one side seems to have been affected by the pressure, though on the other it was not. This nerve occupies a position with regard to the bony structures at its point of entrance at the base of the skull which makes it liable sometimes to be affected by an increase of intracranial pressure. It is the interference with the sensory function of this nerve which caused the sharp neuralgic pains just below the eye.

The most important objection to considering that we had to do with a tumor of the pons in this case lies in the presence so prominently of psychical symptoms as a feature of the affection. These have been known to occur in connection with lesions of the pons, but extremely rarely. On the other hand, in tumors of the frontal lobes, while not invariably present, they constitute a characteristic symptom.

Their peculiarity in this case adds to the probability that it was a lesion of the frontal lobes that was present. Jastrowitz called attention in 1889 to the fact that tumors of the frontal lobes often cause a special form of mental trouble, a mental foolishness, the "Moria" of the older psychiatrists, combined with a tendency to talk a good deal, and the general trend of the talk towards sexual subjects. Outspoken obscenity, though utterly opposed to the usual habits of the patient, he observed in a number of cases.

Oppenheim noted in tumors, especially of the frontal lobes, that one of the earliest symptoms was not infrequently a tendency to talkativeness, particularly a persistent habit of making jokes, or what

might pass for such,—jokers' mania. The condition is an analogous one mentally to the condition we have had under observation in this case, and is confirmatory of the diagnosis of tumor. It is worthy of note that in Oppenheim's cases, too, the tumors were always of the right frontal lobes.

With reference to the facial paralysis here, it may be objected that the upper branch of the facial is not usually affected in cortical lesions, while this was one of the notable symptoms in this case. But the non-involvement of the upper facialis branch in these cases is only a general rule, to which a large number of exceptions have been noted and substantiated by the autopsies.

With an affection of the cortex presupposed, the explanation of the disturbances of sensation is comparatively easy. That there are sensory centres in the cortex seems clear from a number of considerations; among others, from the paræsthesia, hyperæsthesia, and hyperanæsthesia that accompany attacks of Jacksonian epilepsy occurring as a result of the removal of tumors from the cortex, which give sensory disturbances, and, finally, from the study of preparations from cases in which anomalies of sensation had been noted.

That some of the sensory centres coexist with the motor centres in the Rolandic convolutions seems also clear. There is, as a rule, some disturbances of sensation when the motor centres are sufficiently affected to give paretic symptoms. Often paræsthesias, creepy feelings, tingling sensations, or a blunting of sensibility occur as a forerunner of mono- or hemiplegia; while at times hyperæsthesia is noted as a preliminary to the paralysis, the sensory centres being irritated into heightened activity before being hindered in the further performance of their function.

There remains to be explained, then, the involvement of the left abducens in a right-sided tumor. We can only think of indirect pressure effects, which were to be felt not alone in the immediate neighborhood of the tumor, but at a distance from it. The increased intracranial pressure caused by the growing neoplasm, even though situated only in the frontal lobes, would be felt all over the skull, from the forehead back to the occiput, and reflected because of the solid bony inclosure down on to the base. In such conditions of increased intracranial pressure the abducens, because of its delicacy and the long course it runs along the base of the brain from its point of origin to its point of exit from the skull, is especially liable to

suffer. It has been noted more than once in brain tumors that the opposite abducens was involved, the sixth nerve on the side of the tumor being spared, though much oftener than this both are affected. The reason for this anomaly has not always been easy to point out even at the autopsy. We can only assure ourselves that it is possible, and so let it not impeach our diagnosis. We have had, then, to do in this case most probably with a gumma of the frontal lobes having its origin in the meninges, perhaps in the *right* frontal region. This caused the hemiparesis by pressure upon the motor centres in the Rolandic region, caused the disturbances of sensation by interfering with the sensory centres in the frontal and other regions, and the paralysis of the abducens on the opposite side by counterpressure upon the base.

The lesson of the case is the importance of antisyphilitic treatment, prompt, thorough, and fearless, when the symptoms of a brain tumor are present, even though the history gives no clue of syphilitic infection. Therapeutics in nervous diseases generally is so utterly unavailing and so thankless, that it is a source of special pleasure to see the wonderful therapeutic success which follows a course of the iodides and mercurial inunctions when it is really a syphilitic affection that is at work. Our patient came to us seemingly in a most hopeless state, and in a short six weeks we are able to dismiss her perfectly cured. Practically, not a symptom of her former serious conditions remains. A month later, after repeated careful examinations, it was clear that the cure was a lasting one. Some paræsthesiæ remained in the left arm, however, and it seems not unlikely that they are to be attributed to the cicatricial tissue that has replaced the syphilitic process after healing took place.

MULTIPLE SCLEROSIS WITH CEREBELLAR SYMPTOMS; CEREBELLAR TUMORS.[1]

CLINICAL LECTURE DELIVERED AT THE CHARITÉ HOSPITAL, BERLIN.

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GENTLEMEN,—I showed you at our last clinic two classical cases of multiple sclerosis. There was no possibility of a mistake in the diagnosis of either of them. There was the intentional tremor, the scanning speech, the nystagmus, the heightened tendon reflexes, and the early age at which the symptoms developed, all to make assurance doubly sure in the diagnosis. The cases differed only in this: that while one developed gradually, the other produced symptoms which suddenly began with an apoplectiform attack, though the course of the disease was the classical one.

You must not imagine, however, that all the cases of multiple sclerosis are equally typical. The multiple sclerotic patches may involve any part of the central nervous system from the cortex to the cauda equina, so that we may have combinations of the most varied sensory and motor disturbances. The sclerotic areas that first cause symptoms may be situated in any part of brain or cord, so that the first manifestations may be of the most deceptive character. The multiplicity of the lesions soon becomes evident, however, and then the diagnosis is usually easy.

It is the motor symptoms that are of most importance for the recognition of the disease. One of the prominent motor symptoms of multiple sclerosis is often spastic palsy. This symptom may proceed, however, from lesions localized in the motor columns of the cord, so that the motor tracts are affected as a whole, or it may come

[1] Reported by James J. Walsh, Ph.D., M.D.

from partial interruption of the motor columns by a circumscribed lesion. The differentiation of spinal spastic paraplegia, the affection of the motor columns from multiple sclerosis, in which one of the sclerosed areas affects the motor tract somewhere in its course, is, as a rule, not very difficult. There are other symptoms that develop very shortly after the spastic paraplegia in multiple sclerosis, if the disease should begin with that single symptom. At first under such circumstances differentiation is practically impossible, but the development of complications, especially those which show that the brain as well as the cord is affected, soon settles the diagnosis.

When the sclerosis affects the cerebellum a typical set of cerebellar symptoms, especially the well-known cerebellar ataxia, develops. The distinction from a purely cerebellar affection is then not always easy, especially as tumors of the cerebellum often cause a series of disturbances of the special senses by affecting the nerves at the base of the brain, which might seem to simulate the effects of multiple foci of disturbance in the central nervous system.

I have a case of cerebellar multiple sclerosis to show you this morning, and with it, by way of contrast, some pure lesions of the cerebellum. Our first patient is a baker, thirty-seven years of age, who confesses to have been a *potator strenuus*, "a hard drinker." He noticed his first symptoms some eight years ago. They consisted of a tendency to vertigo and an insecurity in his walk, so that even when he had taken no liquor he walked as if intoxicated. This staggering gait grew gradually worse until, in 1894, he was unable to walk alone. In 1895 diplopia developed and his sight grew less acute. He consulted an ophthalmologist, and after a while his eye symptoms seemed to improve some. He has been with us now for more than a year, and his affection seems to be practically at a standstill, no new symptoms or exacerbations of existing ones having occurred while he has been here.

When I have him walk the principal symptom of his affection is evident to you all. The picture is, unfortunately, not an unfamiliar one on the streets of Berlin. He spreads his legs—that is, keeps his feet well apart—and sets his feet down with a certain uncertainty and tentative irregularity that is typical of acute alcoholic intoxication. When he stops he must pull himself together to be assured of his equilibrium, and on starting again must make a noticeable conscious effort at balancing himself for the first step. As he turns at the end

of his little excursions back and forward, this necessity for conscious equilibration is very noticeable.

This condition of staggering gait has lasted now for years, and its persistence points definitely to an affection of the cerebellum. That such an affection exists in this case is sure; but is there nothing else, and will a cerebellar lesion explain all the symptoms of this case? This is the interesting question that must always be asked when so-called cerebellar symptoms, especially the cerebellar gait, are noticed. Here we shall have to answer that question in the negative.

After the disequilibration the most noticeable symptoms are those of the eye. The records of the eye clinic at the hospital show that when he first came under observation there was well-marked diplopia and diminution of vision in both eyes. Though less in intensity than at that time, both these symptoms exist yet. The diplopia is homonymous. Objectively we note a slight tendency to convergent strabismus. When his eyes are fixed directly in front they are restful, but when we have him look to the left, tremulous movements of the eyeballs are set up, a true lateral nystagmus. We note, too, that his left eye does not move as far towards the left as the right eye, so that there is a paresis of the abducens on the left.

As we have him make other movements with the eyes, we find that whenever they are directed away from the median line these tremulous movements occur. As I showed you at the last clinic in connection with typical multiple sclerosis, this is really an intention-tremor,—*i.e.*, a tremor that sets in whenever a voluntary movement is attempted, and this tremor of the eyeball is as characteristic of the disease as the coarser tremor of the hands or feet.

In his eye-ground we find ample reason for the lessening of vision of which he complains. In the left eye the veins are enlarged and tortuous, there is no prominence of the papilla, no outspoken congestive symptoms of "choked disk," but there is a whiteness of the papilla in the temporal part asserting itself that indicates that optic atrophy is setting in. In the right eye the same affection is just beginning.

His speech is peculiar, but by no means typical of multiple sclerosis, or, for that matter, of any nervous affection. It is nasal and drawling in character, but not scanning. The nasal element in it may be due to palsy or defect of the soft palate. He says that he

has always spoken like this, and that neither he nor his friends have noticed any change in his speech. Such functional disturbances of the soft palate are often congenital and persist through life, without any lesion to account for them being found either during life or post mortem. The peculiarity of speech here is not a specific symptom of disease. Though drawling and nasal, there is not the omission of syllables so characteristic of general paralysis, and, besides, he talks too readily and easily for that.

With regard to his general symptoms, you have just heard him tell us that as a child he suffered a good deal from headache. Between eight and fifteen years of age, when he worked or went to school, he had headaches so severe that he remembers them very well. It was sometimes more, then, than the passing indisposition of childhood. His first symptom of his illness was a sense of vertigo, but long before that he remembers he had headaches. He does not suffer from headaches now, nor has he since he has grown up. These headaches as a child are extremely interesting, since they may indicate the beginning of the affection long before the first evident objective symptoms of it made their appearance. He has never had attacks of vomiting and he has never had convulsions.

Examination of his limbs shows that he has plenty of muscular power in them, despite the tremulous ataxia of them when he moves them voluntarily. When we have him put his index-fingers on his nose we find a certain amount of incoördination; when we have him put his heel on the knee of the other leg, we can scarcely notice any ataxia or uncertainty in the movement, so that contrary to the usual rule the incoördination is more marked in the upper extremity. His patellar reflexes are slightly higher than normal, and there is double ankle-clonus. Careful examination beforehand has shown that he has slight disturbances of sensibility.

With this combination of symptoms, what have we to treat? The persistent cerebellar gait points surely to an affection of the cerebellum, for while not all lesions of the cerebellum give this drunken gait, its presence for a long time always points to a lesion of the cerebellum and usually of the middle lobe, the vermis. A cerebellar affection would not explain the eye symptoms, however. The paresis of the abducens points to an affection of the pons, and the nystagmus, which takes place in all directions and follows every movement of the eyeball, indicating that all the eye-muscles are affected in their

functions, points to a lesion or lesions near the nuclei of the nerves supplying these muscles. Even the oculomotor and trochlear nerves are affected, so that the lesion if single would have to be rather extensive.

A tumor of the cerebellum often causes pontile symptoms by its interference with pontile function through pressure. At times these pressure symptoms may be occasioned at quite a distance from the tumor itself. Often, for instance, they affect the eye-muscle nerves, especially the oculomotor and the abducens. Here, however, I think we can exclude tumor, first, because of the slowness of its growth. The first symptoms of the affection were felt in 1889, about ten years ago, and yet the symptoms even now are not very severe. It is true I once saw a cerebellar tumor that was eight years in causing a fatal termination, so that the slow development does not absolutely exclude tumor.

If we had a tumor here, however, it would be a large one, since it is affecting parts quite a little separated from each other. From a large tumor we would surely have the trias of symptoms that so seldom fail in brain tumors,—headache, vomiting, and choked disks. This trias, or two of its symptoms at least, are usually present in all cerebellar tumors. With the other cerebellar symptoms so marked, we would surely have them here if there was a tumor.

Besides tumor we may have a sclerosis to account for the cerebellar and the ocular symptoms. They find their readiest explanation in a large area of sclerosis in the cerebellum, connected, perhaps, with a similar area in the pons, or two distinct sclerotic patches. For the existence of multiple sclerosis in the case, we have the history of severe headaches as a child, which may indicate, as is so often the case, that the disease dates for its inception back to the early years of development. The course of the disease has been that of multiple sclerosis, too, for there have been a series of exacerbations and remissions in it. He sees better and walks better now than he did a year ago. With tumor the symptoms are usually progressive; sometimes they come to a standstill, but almost never do they become less marked.

Atrophy of the cerebellum sometimes gives the cerebellar symptoms noted in this case, but that is a rare condition not often seen, and, besides, it would not give the ocular symptoms noted in the case. One is tempted, of course, in connection with his admitted alcoholism,

to find some etiological link between that and his nervous symptoms. Despite the fact that alcohol produces all manner of nervous changes and manifestations, we are unable to see any *rôle* it has played here, except, perhaps, in making the organism less resistant to other hurtful agents. With sclerosis as we find it in the central nervous system alcohol has certainly nothing to do.

With the diagnosis multiple sclerosis made, the prognosis and therapy can be dismissed in a word. Nothing will recreate degenerated nerve-fibres, so that cure is hopeless, remedies for the affection itself useless. The duration of the affection is absolutely undefined. Here, where there are no bulbar symptoms as yet, the patient may live for years. Then there are often remissions in the symptoms that bring about great improvement in the patient's condition. All of the axis cylinders that pass through a sclerosed area are not degenerated, and after their first loss of function, owing to the acuity of the sclerosis at the beginning, often recover their conducting power very remarkably. In these remissions careful therapy can do a great deal to help nature in her recovery of function, a point I must insist on, but that I have not time to go into to-day.

Our next patient for this morning, a boy of sixteen, also has cerebellar symptoms, especially cerebellar ataxia, but the other symptoms point to a different cause in the case. About eighteen months ago he noticed a sense of insecurity when he walked, which after a while developed into a staggering gait, the same symptoms as were noted in the first case, but here there was soon added the well-known trias of symptoms that point to brain tumor and increased intracranial pressure,—vomiting, headache, and loss of vision.

When he came into the hospital he was completely amaurotic and had constant nystagmus. There was no muscle palsy demonstrable. He was having frequent attacks of intense headache, however, and his general disposition had been affected. He was mostly dull and dazed, taking little notice of what was going on around him. When more impressionable, he was unfriendly, morose, and uncleanly. A change for the better in this regard has been noticeable in the last few weeks.

His present condition: He cannot even tell us from what direction the light comes, so that he is totally blind. With the ophthalmoscope choked disk now going into optic-nerve atrophy has been found. He has a coarse, continuous nystagmus, the movements occur-

ring in all directions. Curiously enough, though totally blind to light perception, his pupils still react to light. It is an interesting phenomenon, that shows that the reflex excito-motor fibres in the optic nerve are different from the true optic fibres, the special sense elements of sight. Even with his features in repose there is a pulling of his mouth somewhat towards the right, and a certain blankness of expression on the left side of the face. When he talks this weakness of the left facial is more pronounced, and when I have him laugh you see the distinct contortion to the right, because the right facial muscles do not meet with their usual resistance from the muscles of the other side.

When his symptoms first began to develop, he says that his hearing on the left was much weaker than it had been before and much weaker than that on the right. Of this asymmetrical affection of the hearing we found no trace here in the hospital, but he is sure that it existed at the beginning of the affection. The symptom is a most interesting and important one for the localization of the lesion.

His knee-jerks are slightly exaggerated, and ankle-clonus is present on both sides. When I have him walk you see that he has, of course, the tentative, groping walk of the blind; but there is something more. He not only feels his way, not putting down his foot till he is sure that it will find a place, but there is a certain lack of equilibrium, a stagger in his walk not usual to the blind. He keeps his feet wide apart, and at turning he must stop and bring himself into equilibrium before starting again. So that even yet we can detect the cerebellar element in his gait, despite the peculiarities introduced into his walk by his blindness. As he walks, you notice that his head hangs to the right and that his body has a tendency to bend in that direction, while he lets his right hand hang and swing awkwardly and does not swing his right foot as well as his left in stepping out.

What have we with this combination of symptoms? There was evidently a great increase of intracranial pressure at first, since the three classical symptoms of headache, vomiting, and choked disk were present. These symptoms of increased pressure might be due to serous meningitis, but though we have punctured the spinal canal twice to relieve the pressure by allowing the egress of cerebrospinal fluid, it has been of no avail in relieving the symptoms. We evidently have to do with a tumor, then. The most prominent symptom for its localization is the cerebellar gait, the staggering walk which

was noticed as the first symptom. This tumor is situated on the left cerebellum hemisphere, since at first the left acousticus was affected and the left facialis is affected now.

As to the nature of the tumor we have at least some ground for a theory. In more than one-half the cases of tumor in the cerebellum, it is a solitary tubercle that is found at autopsy. In young people the proportion of tubercular to other tumors is still greater. Besides, the father of our patient died of tuberculosis. This is only a probability, however, and the tumor may be a glioma, the next most frequent tumor here, but that is usually continuously progressive, and the stationary character that this has assumed here speaks against glioma. On the contrary, this standstill distinctly favors the diagnosis of solitary tubercle, for, after having reached a certain development, these often remain *in statu quo* for a long time, or even calcify and remain absolutely quiescent.

We cannot operate for tumors of the cerebellum, and the only ones for which therapy does any good are those of syphilitic origin. We can only await the result, which, now that the tumor has entered on a state of quiescence, we cannot foretell with any certainty. There is no knowing how long the patient may live in his present condition, not an enviable one, perhaps, but still not so intolerable, and hope of further improvement if the tubercle degenerates is not impossible, but may almost be looked for.

Our third case is one in which the inevitable tendency to death is obvious. It is all the more interesting from one point of view, since our diagnosis will be shortly put to the test of comparison with the post-mortem findings. Our patient is a man of thirty-five, who first came under observation in July, 1896, twenty months ago. He had had his first symptoms in the preceding spring. They were vertigo, with vomiting and headache, followed by loss of sight. He had hallucinations of sight and hearing, and grew morose, irritable, and excitable; then he gradually lost hearing completely, so that now he is both blind and deaf. Examination of his ears gives no external cause for the deafness; in both eyes there is outspoken choked disk and optic atrophy setting in as a consequence. It was very hard to communicate with him at first, but he retained consciousness and was in certain things acutely observant. He would recognize the doctor in the ward by the touch of his hand, and, as he had not lost the faculty of speech, would pour out a whole string

of complaints, for he in his hallucinations considered that he was abused and neglected. Now all that is past. He seems to react to no external stimulus. He does not recognize his relatives when they visit him. At first it sufficed to put food before him, or at most into his hand, and he fed himself. Now he must be fed with a spoon, and is utterly negligent of cleanliness. There is the most absolute apathy in his countenance, and never a wave of emotion crosses his face, though at times, as you have noticed, he puts his hand to his head as if in pain.

Here in his left elbow a contracture has developed, and a contracture also in his legs at the knees. Despite the contracture, a lively knee-jerk can be demonstrated. He has emaciated a great deal in the last month or so, and the atrophy of muscles is marked. Partly because of this atrophy and partly because of the contracture, ankle-clonus is not present, though it was at first, and all the reflexes were heightened.

The acousticus root runs close to the cerebellum, so that a large tumor crossing the median line might easily press on both acoustici and give the condition of deafness that has supervened here. He has severe epileptic attacks at times, and these have become more frequent of late. The attacks are those of true generalized epilepsy, not the local spasms of Jacksonian epilepsy that characterize tumors of the cerebrum. This forms a good differential diagnostic point for cerebellar tumors. Shortly before the first severe symptoms of his present affection developed he had a severe fall from the deck of a vessel into its hold. He landed on the back of his head and lay for a good while unconscious. He seemed to get perfectly over this, however, and had no bleeding from his ears or mouth, so that there was no immediate reason to suspect fracture of the base of the skull. After a while, however, he began to complain of headache and vertigo. He is not sure whether he did not have some headache and occasional dizziness before his fall. In fact, it seems not impossible that the fall may have been due to such an attack of dizziness. After the fall, however, there was a rapid development of all the symptoms.

We might think of a large hemorrhage at the base of the brain, but in that case, with sight and hearing affected as much as they are here, other basal nerves would have been affected, too. A more likely cause for the sudden acuity of symptoms would be a hemorrhage into a tumor, the neoplastic tissue not possessing blood-vessels

as resistant to external influences as the brain substance itself, the irritation set up by the presence of the clot causing more rapid growth of the tumor afterwards.

In a certain number of reported cases of brain tumor, however, trauma seems to have been the immediate cause for its development. Perhaps displaced embryonal tissue elements were thus aroused into reproductive activity. The tumor in this case is now certainly a large one and necessarily fatal. Death may come suddenly from pressure on the bulb, but of late his general health has deteriorated so much that it seems more probable that he will die from marasmus. He has not long to live, and the autopsy will be the critic of our diagnosis.

CHRONIC POLIOENCEPHALITIS SUPERIOR; INFLUENZA ENCEPHALITIS.

CLINICAL LECTURE DELIVERED AT THE WEST PENN MEDICAL COLLEGE, PITTSBURG, PENNSYLVANIA.

BY EDWARD E. MAYER, A.M., M.D.,

GENTLEMEN,—Although our knowledge of inflammatory brain affections is by no means complete, we are nevertheless far in advance of the previous generation. We know now that inflammation, as it occurs in other parts of the body, may also take place in the brain; we know the inaccuracy of the old designations red, yellow, and white softening; we realize that inflammation of the brain may be as varied and diverse in form as is inflammation of any other organ; and, what is most important, we have come to realize the important part which microbes play in the causation of these brain inflammations.

Encephalitis, or, as some call it, cerebritis, cannot yet be scientifically classified, nor will its classification ever be anything but artificial, as different etiologic factors, varied types of inflammation, and difference in function of the parts involved will always create confusion in attempting to assign cases to any particular category. We can, however, assign names to a few types. You all know something of brain abscess, or more properly acute purulent encephalitis. You also know that we have a group of cases which can be classed as acute non-suppurative encephalitis. Mills classifies acute primary encephalitis into focal and diffuse, or disseminated, but frankly says that a sharp distinction cannot always be made between them. Writers formerly wrote much of meningo-encephalitis, in which the inflammation extended to the brain from the meninges; and some even asserted that all cases originated in this manner. But we know now that inflammation of the brain can originate and be confined to any part of this organ. We have also some special classes

named variously according to course and location, as acute hemorrhagic encephalitis, acute and chronic polioencephalitis superior, acute encephalomyelitis, etc. Finally, we group some cases according to the cause, as syphilitic encephalitis, influenza encephalitis, etc.

The first case I have to show you presents a typical picture of chronic polioencephalitis superior. This boy, who is sixteen years

FIG. 1.

1. Normal gait. 2. Gait of Case I. (hemi-ataxic). 3. Gait of Case II. (cerebello-ataxic).

of age, had scarlet fever when three years old. Ever since that time he has had some eye trouble. Inquiries elicit but vague information as to its nature. His mother is, however, certain that his right eye turned outward at that time. The patient never had diplopia, and is positive that his condition did not annoy him in the slightest. He

had no other disease previous to or after the scarlet fever. His family history is negative in all respects, except that his father was a heavy drinker. About six months ago, the boy—who before that time had been taken from school and put to work as an errand-boy —suddenly became worse. He tells us that he was constantly sleepy, that his eyesight failed him, and that he began to stagger. He had no fever at any time, no rash, no pain, not even headache. Feeling alarmed, his mother kept him at home, and after some weeks brought him here to the clinic for treatment.

As he entered the room, you all noticed how he lurched to one side. The manner in which he holds his head has probably also caught your attention. As he now stands before you, you see a boy of average height for his age, rather under weight but not emaciated, with an intelligent face. When I first saw him he had a listless, indifferent expression; but his face has brightened considerably since he has been under treatment.

Let us examine him more closely. An examination of the heart, blood-vessels, and lungs reveals no deviation from the normal. His skull is mesocephalic. Neither the cranium nor the vertebral column is tender on percussion. There is no scoliosis, no pressure symptoms, no trophic or secretory disturbances. No disturbance of the olfactory nerve can be detected. There is, also, no impairment of the senses of taste and hearing. On examining the eyes, you will notice that the lids are normal, that the ciliary borders are well rounded, and that he can open and close his eyes normally. On testing for muscular paralysis, we find the following muscles affected:

Right eye: Rectus superior, marked; rectus internus, marked; rectus inferior, slight. Left eye: Rectus superior, paralyzed.

You also notice that the right pupil is dilated, and that it does not react to light or accommodation,—a paralytic mydriasis. You observe, also, the slight protrusion of the right eyeball, a proctosis which is often seen in paralysis of the eye-muscles which hold the eyeball in place. There is no ptosis, and the head is freely movable in all directions. We know, then, that the position of the head—the convexity backward and to the left—is due to the paralysis of the eye-muscles. No diplopia has ever occurred. There is no nystagmus and no hemianopsia. A perimetric examination of his field of vision reveals some contraction, which is more marked in the right eye. Dr. Heckel, of the eye department, kindly tested the

vision and found it to be 20/100 in the right eye and 20/40 in the left. The ophthalmoscope revealed a pronounced papillitis in the right eye, which has lately markedly diminished. His color sense is normal.

The patient can wrinkle his forehead perfectly. His masticatory muscles are normal; his tongue is freely movable, and does not deviate. You will notice, though, a fibrillary tremor of this organ. There is no dysphagia and no speech defect. The patient, however, speaks in a somewhat drawling manner. The musculature of limbs and trunk are perfectly normal. His conjunctival and corneal reflexes are normal, as is also the pharyngeal reflex. The biceps,

FIG. 2*a*.

Case of polioencephalitis superior (patient looking to the left). Showing the characteristic facies, paralysis of right internal rectus, and proctosis.

FIG. 2*b*.

Same looking forward. Showing position of head, proctosis, etc.

ulnar, and periosteal reflexes of the right arm are normal; those of the left arm are perhaps slightly increased. The knee-jerk of the right leg is slightly exaggerated; that of the left leg pronouncedly so, with a second excursion. The abdominal and cremasteric reflexes are normal. No ankle clonus. The sphincters are normal. The fingers show a tremor of about three vibrations in a second, the oscillations being very irregular, and, if you look closely, you will see them interrupted at times by slight athetoid movements. On asking the patient to drink from this glass, you will notice that the

movement is executed well with his right hand, but his left vibrates markedly when near his mouth. The same is noticed when asked to approach with closed eyes the tip of his nose with his index-finger. When asked in a recumbent position to touch his knee with the heel of the other foot the same tremor is noticed in his left leg. I can find no sensory disturbance whatsoever, the sense of touch, pain, temperature, and stereognosis being normal. Upon asking the patient to walk, you notice how he lurches forward to the left with long strides and reels somewhat. This is not so marked as it was when I first saw him. Upon asking him to stand with feet together and eyes closed, notice how he topples to the left.

The patient's urine has been examined and nothing abnormal has been found. He has a voracious appetite, eating much and often; and frequently gets an acute attack of indigestion from this cause, with vomiting, constipation, coated tongue, and fetid breath. The temperature of the two sides of the body is normal and equal. He sleeps well; in fact, is constantly drowsy. You have noticed by his answers that his memory is good and that his intelligence is normal. No degenerate stigmata can be discovered. We have, then, found the following pathologic conditions:

1. Partial paralysis of the right oculomotor nerve.
2. Paralysis of the left rectus superior.
3. Papillitis of the right eye.
4. Left hemiataxia.
5. Tremor and slight athetosis.
6. Drowsiness.
7. Cerebellar-like gait.

Where could the lesion be to cause these symptoms, and what is its nature? At the orbital apex, all the ocular nerves lie close together, and it is hardly possible that the sixth or the ophthalmic branch of the fifth which lie here would be spared. Again, a lesion here would involve all branches and not cause a partial paralysis of the third. In basilar disturbances, also, all branches would be involved, and in this region it is particularly the sixth nerve which is affected, from its long and exposed course. There is no paralysis of the limbs or trunk, as would be the case were the lesion in the cortex or the internal capsule. Lesions affecting the nerves after they leave the nuclei would most probably affect other parts, but there are no symptoms of involvement of other structures. We

must then consider the region where the nuclei lie, extending from the lower angle of the floor of the fourth ventricle to the posterior part of the third as the seat of the lesion. The corpus quadrigeminum lies close to this region, lesions of the posterior part of which evoke ataxia. Leube rightly says that partial third and fourth nerve paralysis point to a process dorsad towards the corpora quadrigemina, which assumption is confirmed when visual disturbances and ataxia occur at the same time,—for the quadrigemina are directly connected with the optic tracts. Optic fibres radiate into the anterior quadrigemina, and there is likewise a direct connection between them and the nerve nuclei (radiary fibres). As the co-ordinating tracts indirectly connect with the quadrigemina, you can see that ataxia may be readily produced by a disturbance in this region. The ataxia may also be directly due to the visual disturbance.

Lesions in this region are often bilateral, but not necessarily so. They comprise a group of cases which, though studied much in the last ten years, are still but imperfectly understood. Graefe in 1856 described a syndrome which he called ophthalmoplegia externa, and in which only the extrinsic eye-muscles were affected. Since his time the word ophthalmoplegia, with various modifying adjectives, has been used by many to signify conditions in which the eye-nuclei were injured. It is, however, at the best only a vague clinical term, expressing no more, as Jeffries has said, than if you would make a diagnosis of stomach-ache. But, unfortunately, no term used at present is entirely satisfactory. Gowers favors nuclear palsy, but this term is also not very expressive. The best term, though objections to it can also be raised, is polioencephalitis superior.

There is no doubt that the attack of scarlet fever when the patient was three years old was the original cause of his trouble. A toxico-chemical inflammation probably occurred at that time; then came a stationary period of twelve years, during which time, however, there is no doubt that the region remained in an impaired condition. Six months ago, according to the history, a sudden progression of symptoms came on, probably due to a slight hemorrhage. This case is then remarkable for the time elapsing between the two attacks. It is most probable that further trouble will occur in future years.

Hemorrhagic polioencephalitis superior, as this disease was called by Wernicke, is due to a lesion in the region of the gray matter in the floor of the third ventricle and the aqueduct of Sylvius. It

may be caused by alcoholism, ptomaine poisoning, or result after some infectious disease.

Wernicke's classical type has an acute onset and course, and generally results in death in from ten to fifteen days. It comes on without premonition, or with prodromes of headache, vertigo, vomiting, etc. The sensorium becomes clouded, delirium or somnolence setting in, perhaps apathy and nuchal rigidity. At the same time the ocular muscles become impaired. Involvement of all ocular muscles is, however, uncommon. Nystagmus, optic neuritis, tremor, and ataxia are also frequent symptoms. The gait is often similar to that of cerebellar ataxia. The reflexes remain normal or are exaggerated, and the pulse is generally accelerated, though fever is uncommon. In cases resulting in death, severe respiratory disturbances come on. The cases which are due to infection are generally milder than those resulting from other causes. They are never as acute, and often extend over years and months. All general signs of brain involvement may be absent.

An artificial distinction has been made, according to whether the upper or lower set of nuclei are involved. If the upper group, as in this case, we call it polioencephalitis superior; if the lower, polioencephalitis inferior. If the gray matter of the cord is involved simultaneously, we speak of polioencephalomyelitis. The type of encephalitis described by Strümpell and Leichtenstern under the name of acute hemorrhagic encephalitis is also mostly due to infection. It is not necessary for an infectious disease to precede it, as it may be evoked by a primary invasion of the central nervous system by the bacilli. This type is always an acute disease, and mostly affects young persons. It may or may not be preceded by the usual cerebral prodromes. The patient becomes comatose, the temperature rises, and nuchal rigidity or convulsions may come on. The respiration becomes accelerated and the pulse-rate increases, though at first the opposite occurs. Death now results or a remission occurs. In the latter case, the sensorium partially clears up and symptoms of paralysis appear. These vary according to the seat of the disease. Nystagmus and optic neuritis have also been noticed.

The two types of encephalitis above described (Wernicke's and Strümpell-Leichtenstern's) are very similar to each other. Indeed, in some cases, a differentiation is impossible, for, as Oppenheim pointed out, mixed and intermediate forms are apt to occur.

Last February, I examined, at the request of Dr. Snively, a case in the West Penn Hospital which answers to Strümpell-Leichtenstern's type. The patient, an ex-soldier, fifty-four years old, and a miner by occupation, had had a severe attack of influenza for five weeks previous to admission. When I saw him two days after he entered the hospital, he was drowsy, answering questions with an effort, and in a slow, almost "scanning" speech. His left pupil was dilated and immobile; he had a slight facial palsy of the left side, nuchal rigidity, and a gait similar to that seen in cerebellar disease. His mental condition gradually became worse, unconsciousness with delirium came on, and the patient died three weeks after admission. An autopsy could not be obtained.

The third case is that of a girl, nineteen years old, seen in consultation with Dr. Heckel, from whose notes I have largely taken the following history. She had an attack of grippe which dated from the 12th of April, ever since which time she has been troubled with a constant headache. She noticed in June that her left eye squinted outward. This was before she was seen by Dr. Heckel, and she cannot give any accurate information concerning it. Later her left eyelid drooped, but it was at no time anything but a partial ptosis. Soon after, a facial palsy of the left side developed, which gradually increased to complete paralysis. This disappeared, and then her right face became paralyzed. This was about the 16th of August.

When first seen, late in June, the vision of the right eye was 20/30, the left eye, 20/30. The optic discs appeared on ophthalmoscopic examination slightly indistinct.

With atropine, three days later, R. V. = 20/200; 20/40 W. — 1.50 D. S.⌒+0.75 D. C. axis 90°. L. V. = 20/200; 20/30 W. + 2.00 D. S.

The ophthalmoscopic appearance was now more pronounced.

On the 11th of July the papillitis was marked, but more pronounced in the right eye. She was given ten grains of potassium iodide, increased to twenty grains, three times a day.

On the 3d of August, V. R. E. = 20/40, with correction; V. L. E. = 20/100, with correction.

The potassium iodide was now increased to thirty grains, three times a day.

On the 10th of August, V. R. E. = 20/40, V. L. E. = 20/70.

In addition to the potassium iodide, one-thirtieth of a grain of strychnine was now given her. The papillitis was now gone from the right eye.

The vision of the left eye is now 20/50 and stationary, with a partial atrophy. Otherwise, she has altogether recovered, all other symptoms that she had—ptosis, facial palsy, and tremor—having disappeared.

You can see by these three cases the diverse forms encephalitis from infection can take. This is, of course, self-evident from the varied functions of the brain and the liability of any part to be involved. It seems to me therefore impossible, as I said before, to make every case fit into an artificial classification, though classification for convenience and accuracy is desirable when practicable. If this hour has done nothing else, it has at least emphasized the gravity of even slight cases of infection, as one can never tell when the brain is going to be attacked. Be always careful, therefore, in making a prognosis, as those interested always think the physician should foresee the future.

As to the treatment of these cases, many drugs have been tried. The Germans favor the antipyretics, sedatives, with ice-bags, and diuretics. In chronic cases, similar to the ones I have described, they can do but little good.

In the first case, I gave strychnine, one-thirtieth grain, before meals, and potassium iodide, ten grains, increasing to twenty grains after meals. The ataxia became better, the papillitis decreased, and the drowsiness disappeared. "Iodism" came on; the treatment was stopped and Fowler's solution given. The boy again relapsed into his old condition. The first treatment was resumed one week ago, and the boy is again improving. It is a mistake to consider potassium iodide as being only efficacious in such conditions when syphilis is the cause, as it does good in other cases also, though the drug may not be borne well. The third case was also placed upon potassium iodide, and now the only symptom remaining is some papillitis in the left eye. With no other drug would the inflammation, to my mind, have been reduced as completely and as quickly.

Surgery.

EXENTERATION OF THE ORBIT.

BY E. TREACHER COLLINS, F.R.C.S. (Eng.),
Assistant Surgeon to the Royal London Ophthalmic Hospital, Moorfields.

Removal of the contents of the orbit is an operation which is required in certain cases of malignant growth:

1. Cases of sarcoma starting in the tissues of the orbit around the eyeball, among the muscles, from the periosteum, or in the lacrymal gland.

2. Cases of sarcoma or glioma which, starting in the eyeball, have extended outward and invaded the orbit tissues.

3. Cases of sarcoma or glioma, starting in the optic nerve or its sheath, in which the surrounding orbital tissues have become involved.

4. Cases of rodent-ulcer or epithelioma of the eyelids, in which the eyeball is affected, or in which so large an area is involved that it is impossible to remove the whole growth without exposing the globe to the risk of certain ulceration.

In the first three classes of cases it is possible to remove the growth, eyeball, and rest of the orbital contents and yet retain the eyelids. In the fourth it is sometimes possible to remove the whole growth and eyeball and yet retain one of the lids. But, though it is possible, in none of the classes of cases do I think it desirable. After the removal of the contents of the orbit, no glass artificial eye can be worn. The upper lid is paralyzed and hangs as a useless, pendulous flap, which in the course of subsequent treatment is always in the way. The conjunctival surface, moreover, is the perpetual source of an annoying and troublesome secretion.

When the orbital contents have to be removed, I think it is better

that the margins of the lids carrying the eyelashes and the whole of the conjunctival sac should also be taken away. If this is done, the whole cavity of the orbit cicatrizes over; the contraction on the neighboring parts causing the eyebrow to be drawn down and the soft tissues of the cheek upward; so that it is often surprising how little deformity is ultimately left.

In a woman who had thick, overhanging eyebrows and much loose skin about the face, upon whom I performed this operation, the parts became so drawn together over the orifice of the orbit that she assured me few people noticed that anything had been done.

In cases of rodent ulcer, or epithelioma, we are sometimes forced to cut through the skin some distance from the margin of the eyelids in order to get clear of the growth; the area of cicatrization and resulting deformity is then necessarily considerably increased. But even in such cases much can afterwards be done by judicious skin-grafting to diminish the defect. The two cases I am about to record illustrate this.

In removal of the contents of the orbit, if the conjunctival sac is included, not only is the patient afterwards more comfortable, but the operation itself can be much more easily and quickly performed. It is remarkable, if a few anatomical points are borne in mind, with what facility the orbital contents down to the bone can be cleared away.

These anatomical points are:

I. That the tissues of each eyelid are limited to the margins of the orbit by the palpebral ligament, a thickened portion of which at the inner angle is known as the tendo oculi.

II. That the periosteum of the orbit is a continuation of the dura mater which enters it at the sphenoidal fissure and optic foramen. This periosteum is exceedingly loosely attached to the bone; and if the palpebral ligament is cut through at the margin of the orbit, by keeping close to the bone it is possible to pass the finger or a pair of scissors back between it and the periosteum to the apex of the orbit.

The only structures which hinder the separation of the periosteum from the wall of the orbit are the origin of the inferior oblique and the pulley for the tendon of the superior oblique.

III. Nearly all the structures which enter the orbit do so close to its apex, through the sphenoidal fissure and the optic foramen. The recti muscles and superior oblique take origin around the optic

foramen; so that by passing the scissors well back to the apex of the orbit and giving one or two vigorous snips, the muscles at their origin and nearly all the structures entering the orbit can be cut through.

The procedure of the operation is as follows: The patient having been anæsthetized, an incision is made through the skin of the eyelids, about ten millimetres from their margins, around the whole palpebral aperture. If the new growth involves part of the skin of the lids, the incision has to be diverted so as to pass through healthy skin well beyond the affected area. Sometimes it is necessary to make it extend down into the cheek or onto the bridge of the nose.

The incision having been made, the skin is next dissected up as far as the margin of the orbit in all directions.

The margin of the orbit having been reached, the palpebral ligament attached to it is cut through in its entire circumference close to the bone.

A stout pair of scissors, curved on the flat, is then taken, and, directed by the finger, passed backward along the outer side of the orbit close to the bone to its apex. A few rapid snips are then made to divide the structures at the apex; the eyeball, conjunctival sac, margins of the lids, growth, and orbit contents being at the same time drawn forward in one mass. Any structures attaching them to the wall of the orbit are to be divided close to the bone until they are entirely separated.

The hemorrhage from the back of the orbit is always free, but is easily controlled by pressure with cottonwood swabs. Should the growth have extended to the cheek or nose, the amount of hemorrhage involved in cutting wide of it is considerably increased. A number of spouting branches of the facial artery are encountered, and sometimes its large terminal branch, the angular. These require the application of pressure-forceps, a good stock of which it is always well to have in readiness for the operation.

The description of the following two cases, taken from my notebooks, will serve to illustrate other details of treatment:

Case I.—May B., aged sixty-eight, was admitted to the Moorfields Hospital on September 10, 1898. She stated that seven years previously a growth commenced as a small wart in the centre of the margin of her right lower lid; it broke down, and then gradually extended. The only treatment she has had has been medicine and ointment prescribed by a homœopathic doctor.

A large, warty, irregular growth occupied the whole of each eyelid on the right side, up to the margin of the orbit. It also extended to the bridge of the nose and the side of the cheek. The lower part of the growth had ulcerated and there was a purulent discharge from it. At times it bled. The eye was completely hidden by the growth. The left eye was normal. Her condition at this time is shown in Fig. 1. Two days after admission, the patient having been anæsthetized with ether, I removed the growth, conjunctival sac, and eyeball *en masse*, in the way already described. The bleeding was free, but was arrested with pressure-forceps and a firm compress.

FIG. 1.

CASE I.—Before operation.

FIG. 2.

CASE I.—After operation.

The wound was afterwards dressed daily with strips of lint spread with boric acid ointment and bicyanide of mercury wool and gauze.

On September 22, a note was made that the wound was healing, the edges rounding off, and that the surface was covered with healthy granulations.

On that day I was performing an Arlt's operation upon a patient for entropion of the upper lid, and I utilized the piece of skin I removed to make eight grafts for the granulating surface in my other patient. Four of these took well and formed islets which materially

assisted the closure of the wound. On November 15, when it was almost entirely healed, she left the hospital. Sections of the growth proved it to be a rodent ulcer. The second photograph (Fig. 2) was taken about two months later.

Case II.—Phillip F., aged forty-eight, was admitted to the Moorfields Hospital on January 29, 1898. About five years before, a small "scab" had appeared just below the lashes in the middle third of his right lower lid. At first he was able to wash it off, when it usually bled. Gradually it extended inward along the margin of the lid, and then outward and backward towards the eye. Occasionally it gave rise to aching and shooting pain.

On examination it was seen that the whole of his right lower lid had been destroyed by an ulcer with firm, raised edges. The conjunctiva between the lower lid and eyeball and the skin at the outer angle of the lachrymal sac were invaded and indurated.

The infiltrated tissue seemed fixed to the margin and floor of the orbit. Apart from some conjunctival injection and thickening at the lower part, the eye itself seemed normal.

The vision was = 6/24 c̄ + 1.5 J.4. No fundus changes could be seen. The left eye was healthy. There could be no doubt that the case was one of rodent ulcer, and on January 31 I removed the orbital contents and the whole of the ulcer in the way I have already described. The orbit was afterwards plugged with strips of lint spread with boric-acid ointment, to arrest hemorrhage.

At the first dressing, the next day, there was a little fresh bleeding, which was stopped by torsion.

On February 19 a healthy granulating surface having formed, some skin-grafts taken from the thigh were planted in the orbit.

On the 25th it was noted that they had taken well and that the surface was rapidly healing.

He left the hospital on March 7, with the wound almost closed.

The bony walls of the orbit for a time tend to limit and define the area involved by a malignant growth commencing in its contents, so that if everything at that stage is taken away down to the bone, the chance of local recurrence is very small.

Sometimes, however, cases are met with where the bone is invaded. In periosteal sarcomata involvement of the bone naturally occurs early. In such cases large areas of the bone can most effectually be destroyed by the use of chloride of zinc paste.

Its application must be carried out with caution, especially if the roof of the orbit is the part involved, in which situation it has been known to produce symptoms of cerebral irritation.

It is best not to apply the paste at the time of the operation, but to wait until two or three days afterwards, when all tendency to bleeding has stopped. It should be spread on lint cut into small pieces, which can be laid on to the exact spot desired. It is well to remember that the caustic effect usually extends over a wider area than that upon which it is laid. Opium should be combined with the chloride of zinc, as its application may cause a good deal of pain. Wheaten flour is used to render the paste of a proper consistency,—twenty grains being taken to mix with each ounce of the solution of zinc chloride and opium.

ENUCLEATION OF THE MUCOSA OF THE APPENDIX.

BY CHARLES S. HAMILTON, M.D.,

Columbus, Ohio.

In a short paper entitled "Enucleation of the Appendix," read before the Ohio State Medical Society in the year 1895, I described a method of removal of the appendix to which I had seen no reference in medical literature, though doubtless many surgeons had resorted to it. The description was as follows:

"An incision was made through the peritoneal investment of the appendix, throughout its entire length. This incision was necessarily in the exposed non-adherent area of the viscus. The peritoneum was then stripped back as far as possible, the appendix grasped with forceps and lifted from its bed by a process of enucleation, until its connection with the cæcum was reached. At this point it was tied off. The peritoneum was then sutured over the stump, and the operation concluded in the usual way. One or two small bleeding points in the peritoneal covering required ligation or temporary forcipressure."

Later I applied the same principle to the removal of the appendix in a slightly different manner,—viz., removal of the mucous membrane alone, with closure by suture of the remaining appendicular structures.

On account of the variety of the pathological conditions which accompany appendicitis, no one method of removing this organ is applicable in all instances. In abscess cases it may be so disguised by inflammatory changes as to be unrecognizable without a dangerously prolonged search. It may lie free in an abscess cavity, so friable that the mere touch of the finger breaks it off near its origin, no ligature or suture being required. Again, it may be gangrenous, the necrotic changes extending into the cæcal wall. When it is removed in the interval between attacks it may be found adherent in

various positions, and so closely attached to coils of intestine that its separation demands the use of the knife or the scissors.

The most common method is doubtless removal by formation of a cuff of peritoneal and muscular coats near the cæcum, with ligation of the mucosa and inversion of the peritoneum by a few Lembert sutures. The mesentery should always be tied in order to secure the artery in its border, which is quite capable of producing an alarming hemorrhage if neglected or improperly secured. Occasionally the ordinary method of resection of the appendix will be found unusually difficult, because of dense adhesions, location of the viscus at the bottom of an unusually deep wound, or friable condition of the parts which renders prolonged or forcible manipulation undesirable. It will then, perhaps, be found advantageous to resort to the procedure which I have named "Enucleation of the Mucosa." This is done as follows:

An incision is made along the surface of the appendix which is opposite the mesenteric border, or as nearly in that line as possible, because the bleeding will be insignificant,—from the tip well back to its junction with the intestine. The incision is carried at once down to the mucosa, which will ordinarily bulge slightly into the wound. A grooved director or probe can then be inserted between the mucous and muscular coats adjacent to the incision and the mucous membrane gradually stripped out entire with the aid of fingers and forceps. The mucosa is peeled out as far as the cæcum, at which point it is ligated with fine silk or catgut. After cutting it away, the stump of the mucosa is touched with pure carbolic acid, and the peritoneal and muscular tissues which are left may be closed by sutures or not, according to the conditions which exist. For example, if they show a tendency to ooze rather freely, it would certainly be wise to use sutures as a means of hæmostasis. In every case in which the condition of the wall of the cæcum permits the use of sutures, they should be so applied as to bury the stump of the mucosa. It is generally unnecessary to tie the meso-appendix, or to ligate individual vessels during the process of enucleation. The operation is one which can be performed rapidly. As here described it is "typical," and circumstances may modify its details in points which are not essential; as, for the sake of illustration, when the appendix is perforated or gangrenous at some point.

It is not claimed that enucleation of the mucous membrane is a

proper method in all cases, for this would be far from true. In advanced cases of appendicitis obliterans, in which the mucosa might be almost entirely destroyed, or so intimately blended with the surrounding tissue as to be practically inseparable, the entire organ should be resected by some one of the methods in common use.

The mucous membrane of the appendix is, of course, its weak point from the pathological point of view. If the appendix had no canal and no mucous lining, it would rarely be the seat of serious pathological changes. But very often at the time of operation the appendix has really no longer a mucosa, it having been destroyed by inflammatory changes, either acute or chronic.

Lastly, the condition of the muscular and peritoneal coats may be such that it is not wise to leave them in the abdominal cavity if they can be removed without undue difficulty. There will remain, however, a percentage of cases in which this procedure will be the most feasible and the safest, as I have learned from experience. It might be practised in the majority of cases operated upon, but would then frequently have no advantage over other well-known methods which accomplish the same purpose in another way. It should be borne in mind that enucleation is of value in precisely those cases where more common methods are difficult of execution or impossible.

DECEPTIVE HEAD INJURIES.

BY EWING MARSHALL, M.D.,

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I HAVE seen so many disappointed faces when the scalp was removed to attend to head injuries, that I am forced to the opinion that in most cases it is impossible to say, by feeling through the scalp, anything closely approximating the actual condition of the skull. In illustrating this fact, I will briefly report four cases:

CASE I.—A little girl about four years of age, while playing in the street, was struck by an electric car. Three competent physicians saw her shortly after the accident, but found no reason to suspect bone, much less brain, injury. The child not only played around the house, but went out on the street.

The third day after the accident, the mother, in combing the child's hair, discovered a boggy condition, and the child was taken to the hospital. When seen at the hospital, the fourth day after the accident, a decided hæmatoma was found over the posterior portion of the left parietal bone. I assisted Dr. George W. Griffiths in the operation to remove the depressed bone lying below the hæmatoma.

When the skull was exposed, it brought into view an extremely peculiar stellate fracture, with the centre very much depressed, and spiculæ running down into the brain. These were all removed, the membranes stitched together over the contused and lacerated brain, and the scalp brought together, except at one point left open for drainage. The child made an uninterrupted recovery with no disagreeable symptoms.

CASE II.—A man about sixty-five years of age, in jumping hurriedly from a car upon a granite pavement, fell heavily upon his back. External evidences gave no sign of fracture, but the extremely grave symptoms strongly indicated brain injury. He was unconscious, but very restless. Soon stertorous breathing began, and he sank into coma from which he never aroused. In the post-mortem

examination a fracture was found at the base, but insignificant in character. The anterior lobe of the right cerebral hemisphere was badly ruptured, also both lobes of the cerebellum.

Case III.—A man about twenty-three years of age fell from the fourth floor of a house that was being built, striking a ladder in transit, and finally landing on a pile of sand in the cellar. He was picked up unconscious. He would occasionally become violent, but never rational until on the tenth day.

There was no external evidence of injury to the skull, but he had symptoms closely simulating those observed in Case II. However, he made a perfect recovery, barring that he had no recollection of the ten days immediately following the accident.

Case IV.—A man fifty-five years of age, walking in the street, was run down by an electric car. Before the car could be brought to a stand-still, it had half-way passed over him.

When the scalp was shaved, a number of cuts and abrasions were discovered; but the worst appearance was just over the superior angle of the occipital bone. Here there were two cuts,—one was about a fourth of an inch long, and the other over an inch. The scalp at this point gave a boggy sensation, and upon pressure we could make out a distinct depression. Down close behind the right ear there was also a cut, as well as several other cuts distributed over the scalp, face, right hand, and right leg; also a considerable abrasion behind and above the left ear.

Supposing there was a depressed fracture at the superior angle of the occipital bone, I made a crescent-shaped incision, the centre of which passed through the cut mentioned as being over an inch long. When the bone was exposed, the depression there was all right, but it was evidently a congenital one. It impressed me as if, when the bones were soft, a thumb about two and one-half inches long had pressed down upon them, and then the bones had hardened, leaving this depression. There was no evidence of recent injury affecting the bones at this point, except that there was a hair-like crack extending from the lower part of this depression around to the right. This I followed until it was met by another fracture meeting it at a right angle. The bone at this point on one side of the fracture was depressed. I chiselled out a triangular piece of bone and found a clot, which was easily removed, and then raised the depressed bone. There was some slight hemorrhage. I introduced my little finger

and found that the fracture extended on down towards the right ear; as there was considerable hemorrhage from the right ear, and the anæsthetist reported the pulse very bad, I closed the scalp after cleansing with normal salt solution, leaving in a strip of iodoform gauze at the most dependent part for drainage. Three hours later the man died.

Of course, greater experience qualifies a man to more nearly reason out the condition below a wounded scalp; but, though I have seen considerable of this work, I would prefer to see the bone below the scalp wound before expressing an opinion, if the force producing the scalp wound has amounted to much.

As a general rule, given an injury to the scalp associated with the cause of which there was any considerable force, I deem it the act of prudence to lift the scalp and examine the bone. Following such practice, I have found considerable fractures with associated brain injury where symptoms were almost entirely wanting, as in Case I. And again there have been serious symptoms associated with which during life no fracture was discovered, as in Cases I. and III.; and, lastly, all the external evidences pointed to fracture at one point; when the bone was uncovered, the fracture was found at a great distance from the conspicuous depression, as shown in the last case.

ON THE DIFFICULTY OF DIFFERENTIATING BETWEEN FEMORAL ANEURISM AND OSTEO-SARCOMA.[1]

BY CARL BECK, M.D.,

New York.

In studying the current literature on femoral aneurism, one gets the impression that the diagnosis of femoral aneurism is very easy. It is true that in the majority of cases the symptoms are well marked, and the diagnosis can be made on simple inspection. But in some instances, as this case will show, the greatest diagnostic difficulties may be offered.

Three years ago, the patient, a healthy man of sixty-nine years, was struck heavily by an iron bar at the lower third of his left thigh. He was laid up for several weeks, constant pain being present in this region. Later on the pain was supposed to be rheumatic, until three months ago the patient noticed a tumor of the size of a lemon in the same area, which gradually increased, the pain sometimes being intense. The surface of the tumor becoming red and tender, slight fluctuation also being assumed at several places, the development of an abscess was thought of. Immobilization and fomentations reduced the inflammatory signs and the swelling decreased somewhat.

Five weeks ago, when I saw the patient for the first time, I found a very large, well-defined ovoid tumor of extreme hardness, a small area of it only appearing elastic. There was *not the slightest sign of pulsation* within the extent of the tumor, which reached from the internal femoral condyle up to the groin. Nothing abnormal could be detected at the lower leg or foot.

There had been slight fever as long as the inflammatory process had lasted, but now the temperature was normal and the pulse 84. Considering the seat, the slow growth, the immobility, the bone-like

[1] Read at the Section in General Surgery of the New York Academy of Medicine, January 9, 1889.

hardness, and the entire absence of pulsation in the tumor, I thought that the favorite neoplasm of this region might be present,—the osteosarcoma, originating from the femoral epiphysis, and calling for the disarticulation of the diseased extremity. But before I could resolve on such a grave suggestion, I determined to consult the Röntgen rays. The skiagram revealed the absolute integrity of the femur, thus excluding the possibility of osteosarcoma. Exploratory aspirations yielded blood, the microscopical examination of which showed nothing extraordinary. Echinococcus appeared to be improbable, in view of its extremely rare occurrence in this country. Osteomyelitis could be excluded definitely on the basis of the history. In osteomyelitis, because of its transparency, a focus would also have shown itself distinctly on the skiagraphic plate, and the same would be true in the case of necrosis.

There was still the possibility of a sarcoma of the sheath of the femoral artery, or of a fibroma, originating from the intermuscular tissue and the fascia, or of an angiolipoma.

In view of these diagnostic uncertainties, I thought it best to resort to an exploratory incision in order to exsect a portion of the tumor for microscopical examination.

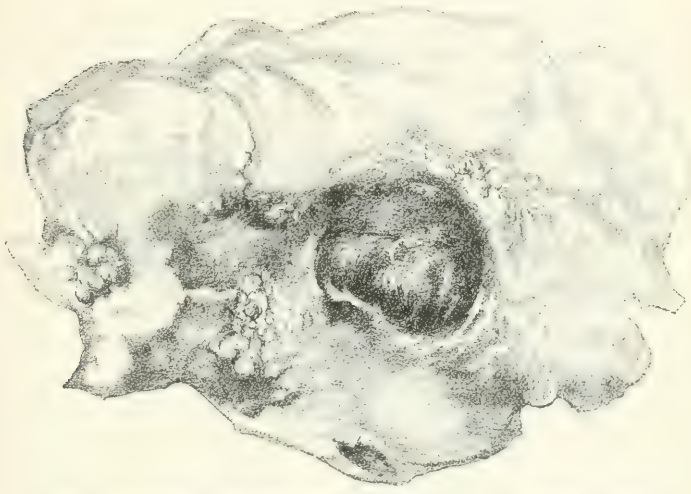
After making an incision alongside the inner margin of the sartorius muscle, I divided the fibres of the vastus internus muscle with the utmost care. But in spite of my precautions, a jet of arterial blood sprang up,—and now the riddle was solved. A large femoral aneurism was situated above the adductor. By forcible pressure the hemorrhage was stopped until Esmarch's bandage was applied, and I ligated the femoral artery in Scarpa's triangle. The large sac, which was entirely filled up by fibrin-clots, was now exsected. The patient stood the operation well, but a few days afterwards pneumonia, probably caused by embolism, set in, from which he is now slowly recovering.

It seems to be probable that the aneurism was of traumatic origin, dating from the injury sustained three years ago. The arterial walls having been squeezed and partially crushed, the artery became dilated; and from the enormous thickening of the sac, it would seem that this dilatation was followed by abundant cell-proliferation in the arterial walls and their vicinity. There is also an enormous amount of pale fibrin in tough layers. One of the fibrin-clots shows the circulatory channel, the caliber of which is much

smaller than that of a normal femoral artery. (Fig. 1.) All these points would account for the absence of pulsation.

While in this case the Röntgen rays failed to give any positive information as to the character of the tumor, the shade caused by the aneurism being so slight that interpretation would have been hazardous, they were of great value inasmuch as they excluded several

FIG. 1.



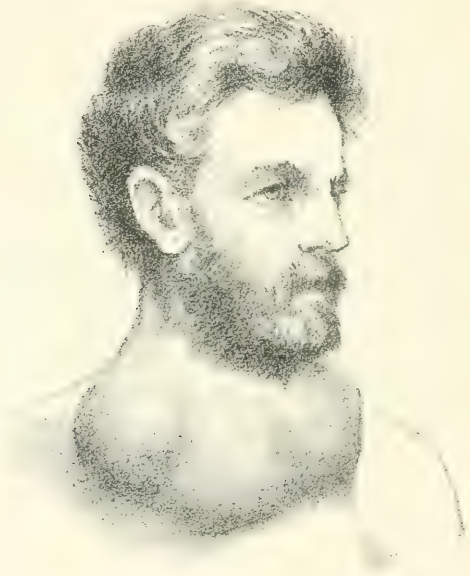
Large fibrin-clot. *C*, representing the caliber of the circulatory channel.

possibilities,—viz., osteoma, osteochondroma, and osteosarcoma. The Röntgen rays must receive the further credit of preventing the consideration of a possible disarticulation.

As to the great importance of the Röntgen Rays in the diagnosis of aneurism, I may refer to my case of aortic aneurism (Fig. 2), published in the *New York Medical Journal*, April 15, 1899, which proves that much more reliable information can be obtained by skiagraphing as to the type, shape, and size than by percussion. (The patient had greatly improved after injections of gelatin had been used and the size of the tumor had decreased. His former hoarseness had also disappeared entirely. In July he died, after three days of an acute attack of pneumonia. The autopsy (see Fig. 3) showed no rupture of the enormous sac, but suppuration of the bronchial glands, caused by the injections.) The thorax, of course, permits of a more marked contrast between its thin muscular cover and the translucent lungs on the one hand, and the opaque aneurism walls on the other,

than exists between such thick, solid layers of a large-sized aneurism wall and the thigh with its very thick muscular layer. It is natural that solid tissue, like that of the thick femoral muscles, veils the outlines of any aneurism wall. So it may be safe to say that in a

Fig. 2.



Case of aortic aneurism.

case of this character the skiagram of the thigh will show the distinct normal outlines of the femur, but no distinct shade in the soft tissues.

In contrast to the normal outlines of the femur is this skiagram, Fig. 4, which represents a case of osteosarcoma in a man of sixty-five years of age. There was also a history of a trauma nine months ago. The changes were so well marked that the skiagram, in connection with the history, and the result of inspection and palpation, rendered the diagnosis beyond doubt. Disarticulation was performed accordingly.

FIG. 3.—Heart and aortic aneurism.

FIG. 4.—Showing osteosarcoma of femur.

Gynæcology and Obstetrics.

SOME OF THE TECHNICAL POINTS FOR ABDOMINAL SECTION.

BY CHAUNCEY D. PALMER,

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THERE are numerous points in the technique of surgical operations for cases demanding abdominal section as yet so unsettled, and matters of so much disputation, that I desire simply to speak of some of my own personal experiences :

1. *Method of Suture of the Stump in Salpingo-Oöphorectomy and Ovariotomy.*—Any suture or method of suturing which is (*a*) liable to slip, increasing thereby the chances for secondary hemorrhage ; (*b*) which includes superfluous tissue and nerves, thereby creating undue pain ; or, (*c*) becomes infected, and thereby the source of irritation, working itself out of the body by some circuitous route, is seriously objectionable.

Silk is firm, strong, not liable to slip, if properly adjusted, but may become infected, may not be absorbed, and may be the nidus of irritation for many months. Silkworm gut and metallic sutures cannot be disposed of, and therefore must become encysted. Catgut or kangaroo tendon, properly prepared and sterilized, is sufficiently strong and life-saving, and does become absorbed within a few weeks, without any local disturbance.

The *Staffordshire* knot is liable to slip, and does include considerable tissue. The figure-of-eight suture will not slip, but grasps much tissue ; hence is painful. The application of either is unsurgical. Experience teaches us that the nicest, most precise, secure, and surgical of all methods to ligate the arterial supply of the ovarian

vessel and upper portion of the broad ligament is, to first transfix the outer extremity of the broad ligament close to the wall of the pelvis, around the infundibulo-pelvic ligament. The inner extremity of the broad ligament is next secured by a ligature, at its nearest attachment to the uterus, so near as not to include any portion of the Fallopian tube. This last step, while not important in ovariotomy or in Battey's operation proper, is quite essential in salpingo-oöphorectomy. Seriously diseased uterine appendages, resultant, as they almost always are on infection, septic or specific, starting first within the uterine cavity, then extending outwardly through the Fallopian tubes and to the ovaries, are present. The uterus having been thoroughly curetted, then irrigated, packed or medicated at the same sitting, we next proceed to open the abdominal cavity, break up all intra-pelvic adhesions, and ligate the ovarian arteries with their branches in the manner described. Catgut is used. The tube, ovary, and adjacent portion of the broad ligament, between these ligatures, is cut away with scissors. Any small bleeding points along the incised edges may be secured with catgut in a continuous suture. All raw surfaces are now closed over, and all portions of an infected and infecting tube, down to, even somewhat into, the adjacent uterine wall, are removed. There remains now no danger of any continuance of *pathological* processes after the operation. So much for a complete eradication of the cornual end of a diseased tube. Nor is there any danger of a secondary hemorrhage, or any fear of annoyance of a retained ligature. Besides, too, the continuance of all *physiological* processes is reduced to a minimum, for absolute and complete enucleation and removal of all ovarian stroma in and about a diseased ovary, are much more practicable. We believe we would hear less frequently of a resumption of menstruation after salpingo-oöphorectomies, if this method were adopted. Certainly any post-operative pain is less. There remains no stump of tube and hilum of ovary to perpetuate local irritation, to slough, or to produce sepsis.

The uterus is put at a physiological rest. Pathological rest is almost uniformly secured by the thorough curettage and intra-uterine medication. Post-operative peritoneal adhesions are not apt to form, for all raw surfaces have been well covered, unless broad tracts of peritoneum are denuded in the separation of adhesions. We confidently can state that many hysterectomies, with their bad after-effects, can in this way be avoided.

Ovarian cysts with well-defined pedicles can better be extirpated by the link ligature, and a subsequent overstretching of the stump with fine catgut.

2. *Peritoneal Irrigation with Salt Water during the Operation.*—In this regard there is much discrepancy of opinion and practice. Penrose, in his excellent work, says there is always danger, in general irrigation of the peritoneum, of spreading infection. Others so contend. This is doubtless true after imperfect irrigations. All peritoneal irrigations should be made with thoroughly sterilized water, at a temperature of 110° F. Doubtless the medication of this warm sterilized water with sterilized salt, adds to efficaciousness.

My own personal experience makes me an earnest advocate for its utilization in all those cases of abdominal section where the operation has been much prolonged, the abdominal and pelvic viscera much handled, where septic material of some kind has gotten into this serous cavity, and where much blood has unavoidably been lost. To be most useful and most safe, the glass irrigating tube is guided by the left hand to the most dependent space,—the bottom of the Douglass fossa,—and this current, from a large glass funnel, about one yard higher than the patient, is allowed to flow in large quantities, until some moments after it passes out in a clear stream. Every fold of intestine and all viscera are thus cleansed. Its use can also be employed after vaginal section, the exit stream there being in that direction. Salt sterilized adds to the cleansing properties, but is especially advantageous after large losses of blood. Some of this salt water is absorbed into the general circulation. The hot current of salt water is most useful in overcoming any depression of the shock, as well as the loss of blood. Some of the same effect is observed, though less actively, as after transfusion of the same fluid into the median cephalic vein of the arm, but more potently than if the injection is made into the rectum and colon. All these means we recently utilized in a bad case of abdominal section, for the extirpation of an ovarian cyst of one side, with an ovarian abscess of the other, and a double catarrhal and purulent salpingitis. The operation was much prolonged, because of innumerable and tough adhesions of the pelvic structures, and because of an unsatisfactory action of the anæsthetic. Recovery followed, however, after a slow convalescence.

Intraperitoneal drainage with glass tubes is unnecessary, if the

peritoneal cavity is well cleansed. No doubt their use is often harmful.

All patients, on whom after section, the abdominal cavity is well irrigated with hot salt water, experience less annoyance from an unbearable thirst. Should this symptom give any trouble, it can be promptly assuaged by repeated rectal injections with hot normal salt water.

3. *Methods of closing the Abdominal Incisions and some Sequelæ thereof.*—If we wish to obtain good and prompt union of the abdominal incision, it is very needful to secure asepsis of the incised edges and surrounding tissues. Abdominal abscesses and fistulæ and sinuses, with ventral herniæ, are sequelæ arising from a neglect of such precautions. We take for granted that the following propositions will not be called in question :

(*a*) The abdominal walls should be incised along the linea alba, and in a straight, even line. The edges of the incised surfaces should not be irregular or ragged.

(*b*) As aseptic conditions as possible of the abdominal wall should be secured before any incision, by free washing with hot water and German green soap, the shaving off of the hair, free irrigation with sterilized water, ablution with alcohol, followed by sponging with sublimate water, the application of the sublimate gauze over night previous to the operation, and a repetition of the same ablutions immediately preceding the section.

(*c*) The incised edges must be rendered clean and aseptic again, after the completion of all intra-abdominal work, so apt are their tissue to become infected by the handling during the section manipulations.

4. *Closing the Abdominal Incision.*—Just what is the best procedure in placing the stitches for closing the abdominal wound is uncertain. Shall we utilize the laminated method,—the suturing of the peritoneal layers, then the parietal fascial layer ; and, finally, the skin ? or, shall we use the through and through suture ? Both methods are used. Either has been followed by prompt and firm union after first intention. Each has failed. Each requires equal asepsis. Personally, I am disposed to depend more on the latter, for I have had less trouble following it. It seems to me that a more accurate and thorough coaptation of the separate layers of the abdominal wall can be secured by the through and through suturing with silkworm

gut, placed three to four for each inch, and inserted in an arc of a small circle, so as to closely approximate the muscle and fascia, as well as the peritoneum and skin. Of course, this method includes all the structures in its embrace. Failure will come, if the suture is passed directly parallel to the sagital plane of the incision, and not as above described. It is important to wipe the incised surfaces clean and dry, and not allow any clots or fluid blood to lodge between their edges, separating them, and preventing their union by first intention. The surface is dressed with a pad of sublimate gauze, held in position with a sterilized Scultetus bandage. No bandage equals the Scultetus, for close and accurate apposition of the uniting surfaces. A thoroughly sterilized abdominal incision, neatly sutured, aseptically dressed, and closely bandaged, need have no further attention for at least a week. Sutures ought not to be removed for two weeks, and then at distinct intervals, of a day or more. The Scultetus bandage is to be worn for many more months.

The after-occurrence of local abscesses, sinuses, fistulæ, from a neglect of such precautions, are best treated by a free evacuation of pus ; by daily irrigation of their tracts with the peroxide of hydrogen ; by applications of sterilized boracic acid and sublimate gauze.

5. *Ventral Hernia.*—Ventral or umbilical hernia results from imperfect union of the underlying layers of fascia and muscles, or from too great tension on these muscles within a few months after the operation. The latter agent appears as the direct exciting cause in many cases, but very often, indeed, is the former a strong contributing factor in causation. Fortunate, indeed, is it that drainage-tubes are used less often now than formerly, for to their employment can we often look for the occurrence of hernia.

A ventral hernia is sometimes an ugly condition to surgically encounter. Its presence means the separation of the deep layers of the abdominal walls, a protruding sac of peritoneum containing omentum and intestines, numerous and firm adhesions within and about, and disturbed relations of all the parts surrounding. Success in handling means a careful dissection to within the sac, the return of displaced parts, the exsection of all relaxed and protruding walls, and the careful approximation of new surfaces, by an abundance of through and through sutures of silkworm gut.

The complete relief of an old and bad ventral hernia is a surgical procedure requiring considerable time, patience, and skill.

6. *Post-Operative Irrigation of the Peritoneal Cavity.*—Most cases of abdominal section for diseased ovaries and Fallopian tubes, for pelvic abscesses, for uterine and ovarian tumors, do well without any further surgical interference. Quiet; the proper regulation of the diet as to time, quantity, and variety; the prompt and free evacuation of the bowels; aseptic catheterization, and cheerful assurances of the attending surgeon, are all sufficient. Convalescence is usually prompt, smooth, and comparatively painless. Every now and then, however, certain intraperitoneal septic and inflammatory conditions are set up, followed by abdominal pain, abnormal excitations of the circulation, elevations of the body temperature, with gastric disturbances, terminating, it may, the life of the patient. Mild cases do well after a few days of interruption. Severe ones are benefited but little by internal medication. Failure to obtain free purgation, with increasing pain and intestinal distention, indicates that no time ought to be wasted before the abdominal cavity is again opened up, freely drained, and cleansed. This is the more rational step to combat the oncoming septic contamination.

Dr. Peaslee was one of the first to propose intraperitoneal injections in the treatment of septicæmia after ovariotomy. His article on this subject appeared in the *American Journal of Obstetrics* for August, 1870. He used solutions of salt water, as being non-irritating and decidedly antiseptic, from once to many times a day, according to conditions.

The best method to cleanse the peritoneal cavity of septic material of any kind is by continuous irrigation. Two gum catheters, or an appropriate glass tube, for an entrance and for an exit current, are in union inserted deep into the abdomen, and a moderate current of warm (98° F.) water from a quart funnel, is continuously, for hours or days, permitted to flow into and pass from, the infected peritoneal cavity. The abdominal opening for the passage of the entrance and exit current tubes must be hermetically sealed with collodion. A nurse is ever at hand to keep the receiving reservoir supplied with proper sterilized water, and at a proper temperature.

We have had these irrigations maintained for several days at a time, in bad cases of septic peritonitis, with the best results. We can then confidently recommend their use in appropriate conditions.

EXTIRPATION OF THE UTERUS, ITS APPENDAGES, TUMORS, ETC., WITHOUT LIGATURES OR RETENTION CLAMPS.—DEMONSTRATIONS OF NEW INSTRUMENT FOR HÆMOSTASIS, WITH REPORT OF CLINICAL CASES.

BY HENRY P. NEWMAN, A.M., M.D.,

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THE prime object of the angiotribe here represented is to produce absolute hæmostasis and do away with ligatures or foreign bodies in the operative field. The medical profession has been struggling with this problem for a long time. It is apparent to all that the ligature is not ideal or even desirable, constituting, as it does, a foreign body always in the nature of a complication in surgical wounds. The écraseur was one of the early manifestations of an epoch to do away with the time-honored ligature. In a modified form it seems to possess some merit. The clamp and cautery has held its place in surgery for a considerable period, and, in spite of some advantages always claimed for the ligature in hemorrhoidal operations, it is probable that the cautery is still used as frequently as the ligature. The retention-clamp, likewise, has been a life-saving substitute for the ligature, and has been a means of revolutionizing pelvic surgery, notwithstanding it is now giving way to better devices. The many methods of perfecting the absorbable sutures and ligatures, both in material used and manner of preparing, only go to show that the profession is fully alive to the importance of doing away with the conventional ligature and suture. The Keith-Skene electric heat, the Doyen crusher, are among the later methods that bid fair to solve a long-sought problem.

It must not be understood that the leaving of foreign bodies in the wound is the only objection to the ligature, while it must be conceded that it is an all-important argument against its use. Other vital objections still remain: 1. Uncertainty as to slipping. 2. Un-

certainty as to asepsis. 3. Shrinkage in the stump, thereby loosening the constricted vessels. 4. Bunching together tissue, and thereby dragging on and displacing neighboring structures. 5. Leaving the foreign bodies in the wound.

The author recognizes that in the individual ligation of vessels some of the above objections would not apply ; but this very desirable method of using the ligature is not always possible or at times advisable. Again, the overtowering advantages of its substitute—here particular reference is made to the Keith-Skene and Doyen methods —apparently leave little room for argument : 1. Immediate and absolute hæmostasis. 2. Perfect antisepsis. 3. An undisturbed stump, —for example, no bunching of pedicle or dragging from neighboring sutures. 4. The operative field free from foreign body, and 5, with the improved instruments recently constructed by the author, promptness of execution and adaptability to nearly all tissues and surgical work.

The general outlines of the instrument can be seen by the accompanying cuts. (Figs. 1, 2, 3.) The length of each blade is thirty-four centimetres, of which eighteen are for the handles, six for the lock, and ten for the blades or jaws of the instrument. The jaws taper slightly from 1.25 centimetres in width and thickness to one centimetre in width and .5 centimetre in thickness. The bite of the jaws is serrated with a deep groove running through its centre, .25 centimetre in width ; the lock is six centimetres in length, four in breadth, and 1.75 in thickness, and the handles are 1.63 centimetres in width and the same in thickness ; at their ends are slots for receiving the cross-bar and screw, or the lever appliance. A small pin placed between the handles near the end serves to prevent too much pressure on the handles and the consequent danger of breaking.

The author's modification differs from the Thumin instrument in having longer blades, enabling one to include the entire broad ligament or large pedicle at a single application. The blades are narrower, so that less space is required in their adaptation to the part, and they can grasp shorter pedicles, or even sessile growths, with greater facility. At the end of one of the blades is a slightly projecting bite, preventing the grasped tissue from extending beyond the blades, as it is apt to do in closing the Thumin instrument.

The lock is separable (Fig. 3), not only rendering it a more aseptic instrument, but allowing the individual introduction of its blades

when desired. A new or modified Thumin lever has been added to the instrument as a special attachment. A combination mortise lock

Fig. 1.

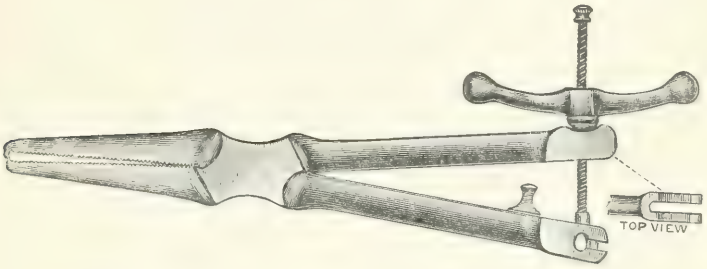


Fig. 2.

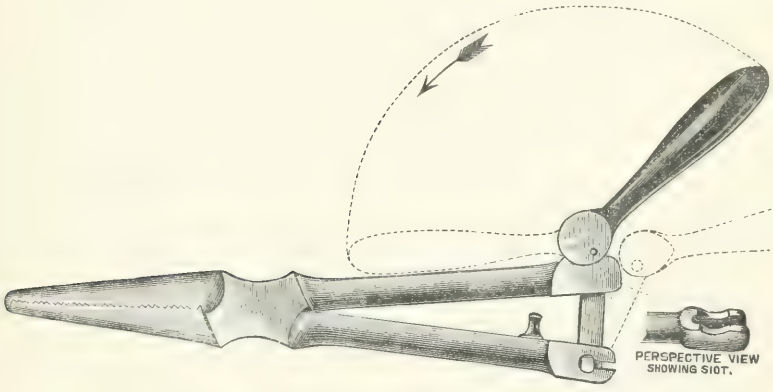
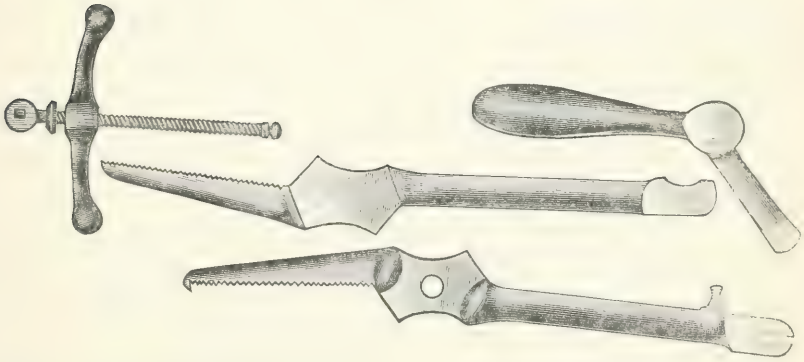


Fig. 3.



allows of an interchange at will of the lever in applying the compressive force to that of the cross-bar and screw.

While the cross-bar and screw will be found most desirable for general use, the lever has great power of compression, and can be applied with a single motion or movement of the hand. This new or modified lever (Fig. 2) not only has the interchangeable lock in common with that of the cross-bar and screw referred to above, but is simple in construction and adaptation, and allows of a much wider separation of the blades during their application. The Thumin lever requires a partial closure of the blade and, necessarily, previous adjustment of the pedicle or tissue with the clamp before adjusting the lock. This obstacle is overcome by the modification, as will be seen by the accompanying cuts. (Figs. 1 and 2.) The instrument, unlike the Bissell instrument used at the Woman's Hospital, New York City, only requires an application of about two minutes, while the former requires from three to five minutes. The instrument is applied to the broad ligaments or any soft tissue to be excised in the same manner as the ordinary broad ligament clamp, using the screw and cross-bar or the lever as the compressive force. Immediately on its application the broad ligament is cut away on the uterine side and close to the clamp, and at the end of two minutes it is removed by releasing the screw or lever, when it is applied on the opposite side in precisely the same manner. The uterus can then be cut away, the toilet of the peritoneum accomplished, and the operation completed, except in abdominal hysterectomy, where the closure of the abdomen would follow. When two instruments are at hand, one can apply them on both sides, and, in simple cases, immediately remove the uterus, placing the drainage gauze, and in the intervals of the two minutes complete the operation. In supra-vaginal amputations of the uterus it is accomplished in the same manner, using the clamp in place of the ligature for the broad ligaments on either side. The flaps are made from behind and in front of the uterus in the usual manner, and subsequently united over the stump with a running catgut suture. I propose substituting a clamp for this part of the operation as well, preferring the thin ribbon-like stump in cementing the flaps together to the union by running ligature. A flat, right-angled clamp, as has been suggested by Thumin, for the vaginal arteries, will, I believe, accomplish this. In ovariotomy or salpingo-oöphorectomy the operation is very simple, clamping and removing. Where there is no pus I use no drainage; where there is a septic condition I have employed either the cautery on the raw amputated

edge of the stump, which is insignificant, or strong carbolic acid. The translucent edge of the compressed tissue is at first quite blanched, but in time, as seen upon dogs, the hyperæmic edge at the attached portion gradually extends its reddened area more and more, so that the entire stump is ultimately resuscitated, and little or no sloughing occurs, as obtains in a large, compressed, and bunched tissue when the conventional ligature is used.

There being no granulating surfaces left, the adhesions so much to be dreaded by the ordinary method do not occur. There being no ligatures left behind, one is relieved of the apprehension of any complications from this source.

Case I.—Mrs. D., aged sixty-two, German, housewife. History of previous illness negative; family history good, except that mother died of tuberculosis. She menstruated first at fifteen; regular until the age of fifty-three, when menses ceased abruptly; no history of irregularity, excessive flow, or pain. Married at the age of twenty; husband living; nine children, whose ages range from forty to twenty. Seven years ago she began to have pain in the back, at intervals; no other symptoms until one year ago, in January, when she began to have discharge and hemorrhage. Hemorrhage irregular, at times a show of blood, then absent, then a flow for a considerable time,—two, three, four, or five weeks. During the past year the patient has been anæmic, and has lost not a little flesh and strength.

Examination revealed a tumor—enlarged uterus—in the pelvis, extending two and a half inches above the pubic bone, hard and nodular.

Diagnosis.—Carcinoma of the uterus, and probable long-standing multiple fibroids.

Operation, January 20, 1899.— Hysterectomy. The vaginal route was chosen, although the vagina was somewhat small and the uterus thrice its normal size. The outlet was enlarged by bilateral incisions. Incisions were made anterior and posterior to the cervix, into the peritoneal cavity, and the left uterine artery severed and tied. An effort was made to pull the uterus down, but this was found impossible, on account of the size, friability, and adhesions. The abdomen was opened and the uterus freed; the clamp or crusher was placed on the broad ligament from above downward, compressed, and left for two and a half minutes. The ligament was cut

on the uterine side of the clamp; clamp loosened; no oozing; clamp placed on the opposite ligament, and this similarly dealt with. The uterus, now free, was lifted out and the abdomen closed; gauze drainage through the vagina. Recovery complete; no after-hemorrhage; only slight serosanguineous oozing from the vagina. Patient up in four weeks, and left the hospital in six weeks.

Case II.—Mrs. E., aged twenty years, American. Family history good. Menstruated first at the age of thirteen; never regular; backache and pain over the right ovarian region, which is increased at the menstrual period. Married one and a half years; menses have been more painful and backache and pain in the right ovarian region more severe since marriage.

Examination showed the uterus to be infantile, cervix small, elongated, and eroded; ovaries large and prolapsed, and this enlargement and prolapse more marked in the right side.

Operation, January 21, 1899.—Curettement, tracheloplasty, cœliotomy; right ovary found low in the cul-de-sac, twice the normal size, with cystic degeneration, tube closed, enlarged, and thickened. Adhesions broken up and ovary and tube removed by means of the crusher or clamp. Left ovary slightly enlarged and cystic; tube closed, and many small cysts around the extremity. A section of cystic ovary was removed, the tube opened, and ampulla everted and held by fine catgut; cysts tied off with catgut. Recovery good; no evidences of hemorrhage from ovarian stump. The patient was getting up in two weeks and left the hospital at the end of the third week.

Case III.—Mrs. F., aged twenty-four, English. Previous history: Patient well, except a monthly hemorrhage from the nose, each time lasting about twenty-four hours. This phenomenon first appeared when the patient was six years of age, and lasted until she was twelve. Mother died at childbirth. The menses first appeared in the thirteenth year of the patient's life, and continued regularly and without pain until the first pregnancy; since birth of first child they have been painful. Married at the age of fifteen years; one child, eight years old; twins, born six and a half years ago, lived six weeks. Husband died in 1894. Patient had a laceration of the cervix and probable infection with the first child. She has not been well since. Her symptoms increased after giving birth to twins; had double salpingo-oöphorectomy and trachelorrhaphy four years

ago ; since then pains in the abdomen have increased rather than diminished ; bowels have been constipated and bladder irritable.

Examination showed the uterus to be large and tender, and especially tender at the horns of the uterus in the old stumps ; consequently a diagnosis of metritis and interstitial salpingitis of the remaining portions of the tube was made.

Operation, January 26, 1899.—Vaginal hysterectomy. The usual incision was made around the cervix, and the uterus free anteriorly and posteriorly. The fundus was then turned forward and pulled downward through the anterior incision. The clamp or crusher was placed on the broad ligament from above downward and left the usual length of time ; then the opposite ligament was treated in the same manner, which completed the operation. Recovery. Relief of pain has been very marked. No hemorrhage followed operation. Suppuration was found in both horns of the uterus. The patient was sitting up in ten days, and left the hospital at the end of three weeks.

Case IV.—Mrs. S., aged twenty-nine, German-American. History : cloakfitter for eight years ; on her feet many hours each day ; large and well developed ; family history good. First menstruated at the age of fourteen years, and was regular until about two years ago. She suffered considerably during the first three years of menstrual life ; then the symptoms became less severe until about seven years ago, since which time they have been growing worse. She has always had severe pain over the lower half of the abdomen during the menstrual period, but during the last year this pain has been constant. She also complained of severe pain in the chest over the cardiac region, without apparent local cause.

Examination revealed stenosis of the os uteri, a large uterus, movable mass to the right and above the uterus. The mass on the right side of the uterus had undoubtedly been taken for a floating kidney, as that diagnosis had been made by Chicago physicians.

Operation.—Curettement, tracheloplasty, cœliotomy. Left ovary found to be the size of a large hen's egg, cystic, and the capsule much thickened, as seen in the specimen ; tube and ovarian ligament were much thickened and elongated, allowing of considerable movement. Ovary removed by means of crusher, leaving tube. The right ovary was found to be the size of a hen's egg, cystic and degenerated, but to a less degree than the left ; cyst of broad ligament the size of a

turkey's egg, situated above the ovary in such a way that the two gave the characteristic kidney shape. Cyst removed and also section of this ovary. Recovery complete; no evidence of hemorrhage. The patient was sitting up in three weeks, and left the hospital at the end of four weeks.

Case V.—Mrs. H., aged thirty, American. Previous history; well until a year ago last Thanksgiving; family history good. Menstruated first at the age of fifteen; menses regular and painless until one year ago last November. Married at the age of twenty-one, only child eight years of age; well after birth of child. Friday morning, after Thanksgiving of 1897, she began to have headache and pains in the back. Friday night she began to vomit. Saturday morning she had pain in the right inguinal region. The pain and vomiting ceased in a few days, but she did not leave her bed until the following March; pain and vomiting with each menstrual period since November, 1897.

Examination revealed laceration of perineum, laceration of cervix, large prolapsed ovary on the left side; prolapsed ovary on the right side; hard body the size of a hickory-nut in the region of the appendix.

Operation, January 26, 1899.—Curettement, tracheloplasty, perineorrhaphy, cœliotomy, appendectomy,—the appendix having been doubled on itself and adherent in such a way as to form the hard body in this region. Section of right ovary removed, and on the left side salpingo-oöphorectomy done with the crusher or clamp; no evidence of hemorrhage. Patient made a complete recovery; was sitting up on the eighteenth day, and left the hospital on the twenty-seventh day after the operation.

Case VI.—Mrs. J., aged fifty-three, Norwegian, housewife. Previous history negative; family history good. Menstruated first at the age of fourteen years; always regular until the last year of menstrual life; ceased to menstruate at the age of forty-eight, five years ago. Married at twenty-one; has had seven children. The abdomen began to enlarge one year ago; patient had a feeling of pressure in the left ovarian region; bowels constipated. Four or five months ago she began to notice a tumor on the left side.

Examination revealed a cystic tumor of the size of the uterus at seven months of pregnancy.

Operation, February 13, 1899.—Removal of the tumor by

means of the clamp or crusher for the pedicle; abdomen closed without drainage. Recovery uninterrupted; no evidence of hemorrhage; sitting up on the eighteenth day, and left the hospital on the twenty-seventh day after the operation.

CASE VII.—Miss T., aged forty-seven, Swedish, dress-maker. Family history good; previous personal history negative. Menstruated first at the age of fifteen; has been regular until last year, when it became excessive and more frequent. Patient is anæmic and has lost flesh; has noticed enlargement of the lower abdomen, of irregular shape, approaching near the umbilicus.

Examination showed the depth of the uterine canal to be six inches; irregular nodular tumor extending laterally into both broad ligaments and up into the umbilicus; movable, and to all appearance no adhesions or involvement of the adnexa; patient has heart-murmur—regurgitant, mitral.

Operation, March 13, 1899.—Hysterectomy; median abdominal incision from one inch above pubis to umbilicus; tumor lifted out of pelvis; clamp applied to the entire length of left broad ligament. The uterus was now cut away from this side, and, on removal of the clamp, was in two minutes applied to the opposite side; uterus cut away with the usual anterior and posterior peritoneal flaps. At one point there was slight bleeding, owing to imperfect closure of the instrument. A catgut ligature was applied, with no further trouble. The peritoneal wound was then rapidly whipped together by continuous catgut sutures, leaving no exposures of the raw surface, or the slightest oozing of blood. The abdomen was closed without drainage. The patient's condition had been precarious from the beginning of the anæsthesia, owing to the defective heart. Notwithstanding the use of restoratives, saline, strychnine, etc., she did not rally, and died on the second morning, from shock and the effects of the heart lesion.

CASE VIII.—Mrs. S., aged forty-eight, American, housewife. Menstruation began at fourteen years of age; regular until the birth of her last child, fourteen years ago; since then very irregular, varying from two to six weeks. Four children, youngest eighteen years old; last labor severe and instrumental, patient suffering considerable trauma.

Examination revealed lacerated perineum, lacerated cervix, endometritis, retroflexion with extensive adhesions.

Operation, March 23, 1899, by Dr. C. W. Barrett, house-physician Marion Sims Sanitarium. Curettement, tracheloplasty, perineorrhaphy, removal of hemorrhoids, cœliotomy, breaking up of adhesions, and double salpingo-oöphorectomy; abdominal fixation of uterus; abdominal wound closed without drainage; no symptoms of hemorrhage. Complete and prompt recovery; was sitting up the twenty-fourth day, and left the hospital on the twenty-eighth day after the operation.

Case IX.—Mrs. W., thirty-six years old, German, housewife. Family history good. Has had three children, the youngest eight years old. Irregular menstruation, menorrhagia, or metrorrhagia, with laterally a bad-smelling leucorrhœal discharge. Backache and constant pain over the left inguinal—ovarian—region.

Diagnosis.—Carcinoma of the uterus.

Operation, April 5, 1899.—Vaginal hysterectomy, by Drs. V. Pleth and C. W. Barrett; angiotribe applied for two and a half minutes on the right broad ligament, after the usual circular incision and separation of bladder and rectum; reapplied on the opposite broad ligament; uterus cut away, including right ovary and tube; left ovary left *in situ* to prevent storm of the menopause; gauze packing in vaginal vault. The patient made an uninterrupted recovery, the highest temperature after the operation being 100° F.; highest pulse, 90. Absolutely no pain or bleeding following the operation. She was sitting up in two weeks, and about in the third week.

Case X.—Mrs. H., aged forty, American. First menstruated at the age of fifteen; always regular but scanty. Married fifteen years; never pregnant. Had severe attack of leucorrhœa twelve years ago, suspected gonorrhœa; was somewhat relieved by treatment, but always had a feeling of weakness and inability to be on her feet for any length of time.

Examination revealed cystic degeneration of the cervix, endometritis, subinvolution, retrodisplacement, with extensive adhesions, pyosalpinx.

Operation, April 6, 1899, at my private hospital.—Curettement, tracheloplasty, cœliotomy, extensive adhesions torn up, double salpingo-oöphorectomy, drainage through vagina; no evidence of hemorrhage. Almost immediate relief of symptoms. Was up on the twenty-third day, and left the hospital on the twenty-seventh day after the operation.

Case XI.—Miss M., aged forty-three, German. Menses first appeared at fourteen; always regular. Three years ago she gave birth to a seven-months' child; septic labor; since birth of child, pain at menstrual period, severe for one week before the flow, continuing and becoming worse until it is now constant.

Examination revealed laceration of the perineum, laceration of the cervix, endometritis, retrodisplacement, and inflammatory thickening of both broad ligaments, with extensive adhesions.

Operation, April 13, 1899.—Curettement, tracheloplasty, perineorrhaphy, cœliotomy; adhesions broken up, right salpingo-oophorectomy with clamp; cyst removed from left ovary; suspensio-uteri operation; closure of the abdomen with silkworm-gut suture, without drainage; no evidence of hemorrhage. Entirely smooth recovery; got up on the twenty-second day, and left the hospital on the twenty-sixth day after the operation.

Case XII.—Miss F., aged twenty-eight, American, teacher. Family history negative. First menstruated at the age of fifteen; pain first two days. One and a half years ago she had a fall, and has not been well since.

Operation, April 15, 1899.—Left salpingo-oöphorectomy by means of the clamp; cyst removed from right ovary; suspensio-uteri operation; abdomen closed without drainage; no hemorrhage. Perfectly smooth recovery; sitting up on the eighteenth day; left hospital at end of third week.

Case XIII.—Mrs. R., aged thirty-three, German, housewife. Married sixteen years; five children; two miscarriages at four and a half and eight months. First menstruated at twelve years of age. Last pregnancy three and a half years ago; difficult labor; not well since; backache, dragging feeling, pain over ovaries and intestinal disturbance, vomiting, constipation.

Examination disclosed laceration of the perineum and cervix with large protruding hemorrhoids.

Operation, April 24, 1899, at my private hospital.—Curettement, tracheloplasty, perineorrhaphy, and removal of hemorrhoids by means of the angiotribe and cauterization. Prompt recovery; no bleeding, and but a minimum irritation from hemorrhoidal operation; up on the sixteenth day. Patient is about to leave the hospital.

Case XIV.—Mrs. K., aged thirty-seven, American, housewife, widow. First menstruated at thirteen; always regular; no pains.

Two children, sixteen and seventeen ; one miscarriage. Began to have irregular menses four or five years ago, and latterly has become very profuse ; menorrhagia and metrorrhagia.

Examination shows large irregular tumor extending to the left and as high as the umbilicus ; patient anæmic.

Operation, May 7, 1899, at my private hospital.—Abdominal hysterectomy with clamp. Patient has to this date made uninterrupted recovery ; no bleeding, no rise of temperature or increased heart action.

Case XV.—Mrs. N., aged forty-three, German, housewife. Family history good. Two children ; normal delivery ; inflammation of the bowels eight years ago. First menstruated at fifteen years of age ; regular ; always with some pain ; last ten or twelve months has had increased pain in pelvis, and more flow, with greater frequency. A mass can readily be palpated over the right iliac and lumbar region, connected with the uterus, nodular in outline.

Diagnosis. Multiple fibroids of the uterus.

Operation, April 25, 1899, in the amphitheatre of the Chicago Policlinic.—Combined vaginal and abdominal hysterectomy with the angiotribe. The Thumin instrument was used here,—my own being out of order,—and in its double application on each broad ligament the uterine artery was not engaged on one side, necessitating the use of a retention clamp. Patient sitting up on the sixteenth day, and will soon leave the hospital ; no bleeding or adverse symptoms whatever.

Case XVI.—Mrs. H., aged fifty-four, American, housewife. Father died of pulmonary tuberculosis ; mother in good health, aged seventy-five ; brother fifty-seven, good health ; all the diseases of childhood ; a severe attack of typhoid fever at twelve ; never strong ; two attacks of inflammation of the bowels, twenty and twenty-five years ago. First menstruated at seventeen ; irregular ; every two to four weeks ; painful ; excessive flow, lasting five to six days ; leucorrhœa, from early menstrual life. Married at twenty-one ; six children ; normal deliveries ; one child is tubercular. Present condition ; Menopause two years ago ; leucorrhœal discharge has become worse ; with bad odor of late ; pains in the inguinal regions and back, increasing in severity and more continuous ; anæmic.

Diagnosis.—Uterine carcinoma.

Operation, May 5, 1899, in the amphitheatre of the Chicago Poli-

clinic.—Combined vaginal hysterectomy by means of the angiotribe ; nothing unusual in the application, except the vessels of the broad ligament were large and a pulsating uterine artery led me to apply a retention clamp on one side, and radical operation for hemorrhoids (clamp and cautery). As my own clamp had been used and soiled, I did the operation on the hemorrhoids by means of the Kelley clamp. Three hours after the operation I was called to the hospital, as the patient had severe flooding. On examination I found that the bleeding was from the hemorrhoidal vessels. Clamps were applied, and no further bleeding took place. Since then she has had uninterrupted recovery. The gauze has been removed from the vagina, and there is no evidence whatever of bleeding from the broad ligaments or hysterectomy wound, and she is feeling well.

Ophthalmology.

THE OCULAR SYMPTOMS IN A CASE OF LEONTIASIS OSSEA.[1]

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THE presence of ocular symptoms in typical cases of leontiasis ossea and their almost uniform and early appearance in that most frequent expression of the disease which, according to the classification of Baumgarten, commences in the upper face region, suggest this brief recital of a case[2] at present under observation.

It is the purpose here to refer only to the ocular symptoms which were present when the patient was first seen and those which have developed since, comprising a period of almost four years. It may be at the outset stated that a steady and inexorable advance in the overgrowth of the bones of the face and skull is taking place. Persistent epiphora of the left eye was among the first, if not the first, tangible evidence that this mysterious lesion was in progress. This was observed long before other evidences, and in particular the one of unmistakable change in the expression of her face, or, as she expressed it, "her increasing ugliness," was forced upon her own attention and that of her parents.

The persistent weeping affected only the left eye. It lasted for months. It was evident, from her accurate description, that distention with retention of the contents of the tear sac, due to obstruction in the nasal duct, had been present. Epiphora and the attendant symptoms of blepharitis ciliaris and conjunctivitis disappeared com-

[1] Read at the Ninth International Congress held at Utrecht, Holland, August, 1899.

[2] Brief Clinical Study, published in Cincinnati Lancet-Clinic, December 10, 1898.

pletely with treatment, nor has there come about since this (about seven years) a recurrence of this in the same or a similar disturbance of the other eye.

The next symptom, and the one which later on led to the discovery of the lesion of the bones of the skull, was proptosis. It affected both eyes and accentuated the change of facial expression due to the slow increase of dimensions which was taking place.

Epiphora of the left eye and proptosis of both eyes were noticed at the age of twelve. At fifteen she began—having shortly before this discovered that she was short-sighted—the use of concave glasses.

Fig. 1.

Front view, illustrating the general deformity and increase in facial diameters.

Fig. 2.

Side view.

These afforded her excellent vision. The patient when first seen had just completed her fifteenth year. At that time, or four years ago, both eyes appeared abnormally prominent, the left more so than the right. The face had assumed a gross expression and a quadrangular shape. The asymmetry between the two halves was strikingly marked. The overgrowth involved all the bones of the skull, but was especially pronounced on the part of the left superior maxillary and malar regions. The orbital margin of the frontal, superior maxillary, and malar bones was thickened and rounded off. The orbits appeared

more shallow and contracted, and, if it had not been for this bevelling off and excessive thickening of their free margins and the region immediately adjacent, the prominence of the eyes would have appeared even more marked.

Functional examination disclosed divergence of fifteen degrees of the left eye. M. 6 D. v = 0.7 r. e. M. 6.5 D. v = 0.5 l. e. Perimetric examination developed nothing abnormal. Color perception and color limits in both eyes normal. Ophthalmoscopic examination, aside from discoloration (pallor) of the optic papillæ, was negative. There was no restriction to the muscular excursions of the globe or eyelids. The degree of proptosis could not, owing to the irregular thickening of the margins of the orbits, be accurately determined. The left eye was markedly more prominent than the right. Since then (an interval of four years), and in particular during the last eighteen months, without an increase in the degree of myopia or other tangible disturbance on the part of the dioptric media, there has come about slight but perceptible reduction of vision in the right eye and steadily increasing loss of vision of the left eye. It is now evident that optic atrophy is in progress. Formerly, ophthalmoscopic examination furnished only negative disclosures; at present, and for several months past, atrophic changes of the nerve-heads are unmistakable in both eyes. In the left this is more pronounced. Here, also, the excavation of the nerve-head and changes on the part of the blood-vessels are more marked. Perimetric examination now furnishes rather uncommon disclosures. In the right or best eye, vision, which formerly was 0.7 with — 6 D. sph., is at present reduced to 0.5, barely, with same corrective lens. But there is no discomfort complained of, and vision for near is perfect. The field for white is markedly reduced, but without impairment of the central regions. Perception for red and the field for red as well are completely abolished. Yellow is very uncertain, but perception and field for green and blue are intact.

The left or most defective eye, which formerly, aided by — 6.5 D. sph., had a vision of 0.5, at present, without increase of myopia and with the same optical aid, has only a vision of 0.1. Perimetric examination develops an irregularly contracted field with preservations of central perception. Perception and fields for all colors good, only relatively contracted within the reduced limit for white. The most careful neurological examination fails at present to furnish disclosures

pointing to a manifest lesion of the cerebro-spinal axis. A strong neurotic element is present, but other evidences of hysteria are absent. Her general health remains good. Menstruation undisturbed. Blood count shows the presence of leucocytosis. The case brings up the interesting query concerning the probable cause of the optic nerve lesion, and, in particular, whether it is associated with a contraction of the optic canals attended by direct compression of the nerve-trunks, or whether, after all, the primary lesion must be sought in obscure trophic disturbance in at present unknown regions of the central nervous systems, resembling, in this particular, acromegaly, and its probable dependence upon morbid changes in the pituitary gland.

In some of the skulls found in museums without ante-mortem accounts, contraction of the various openings of the skull is noted. Optic neuritis and optic atrophy are referred to in the rather scant literature of Hyperostosis Cranii or Leontiasis ossea. But in these few cases the accounts are most uncertain concerning the ocular symptoms and their probable dependence upon direct compression, as reliable post-mortem accounts are absent. Clinical study of this case rather inclines me to the opinion that the optic nerve lesion has a mysterious central origin.

Laryngology and Pharyngology.

DEFECTS OF SPEECH.

CLINICAL LECTURE DELIVERED AT THE POLYCLINIC HOSPITAL, PHILADELPHIA.

BY G. HUDSON MAKUEN, M.D.,

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GENTLEMEN,—In order that you may have a better understanding of the cases that will be shown you this afternoon, allow me to say a few words in recapitulation of my last lecture. You will recall the fact that you were given two short definitions, one of voice and one of speech. Voice was defined as a moving column of breath set in vibration by its own impact with the vocal bands and re-enforced by its diffusion through the various resonators into the surrounding atmosphere, and speech was defined as articulated voice. Voice, then, is the material out of which speech is made.

In the production of voice, two distinct mechanisms are employed,—the vocal mechanism and the respiratory mechanism. You were told that these two mechanisms could work independently of each other owing to the fact that the muscles of each have a separate nerve supply. In the breathing of voice production, there is a certain definite co-ordinate action of the respiratory muscles, as there is in the vocalizing muscles during the production of voice, but there must be also in the production of normal voice an accurate co-ordination of one mechanism with the other. Now, for the conversion of voice into speech, another independent mechanism is employed, namely, the articulating mechanism; and in the practical use of normal speech there must be a co-ordination of this with the vocalizing mechanism. The cause for every defect of speech may be

found to exist in a faulty action in the muscles of one or more of these three mechanisms, or in a faulty co-ordination between the mechanisms themselves.

I shall now show you two little stammerers. These boys are six years of age and twins, but in many respects they are very unlike. With the exception of their four beautiful brown eyes, which are exactly alike, they differ very much in appearance. One is a blonde and the other a brunette. The blonde is somewhat smaller in stature and is of the neurasthenic type, while the brunette is of a more phlegmatic disposition. Neither of them is in robust health, although, with the exception of a slight attack of measles, they have never been ill. They have a sluggish disposition and a strong susceptibility to catarrhal colds.

There is no history of ancestral disease of any kind, although the children seem to have inherited certain very marked peculiarities from their mother and maternal aunts. These women are of Jewish extraction, are exceedingly clever, and have a very strong personality. Their speech is characterized by great rapidity of utterance and gesticulatory demonstrations. Some of these peculiarities are reproduced in the boys to a very marked degree. Each one has a strong personality, unlike that which I have ever seen in children of this age. They are both remarkably clever. The smaller one is more brilliant, perhaps, but not so studious as his brother. He can learn the same thing with much less effort, a probable misfortune in this case. The larger boy is of somewhat slower mentality, but he is more persistent and accurate in his methods. The two together can discuss the Hispano-American War or other important topics of the time with great intelligence, and I would add with great fluency, but for the existing impediment of speech. They are inseparable, the one being greatly dependent upon the other, and they have great admiration for each other. The imitative faculty is very strongly developed in them, and what one does the other does or tries to do. They take a mutual pleasure in each other's successes, and there is no trace of envy or jealousy in their dispositions. In addition to the similarity in eyes, they have another thing in common, and that is, as I have suggested above, a defect of speech. Their manner of speaking is somewhat like that of their aunts, in that it is very rapid; but, in addition to their rapidity of speech, they both stammer, and in very much the same way, although in different degrees. The smaller boy

began to stammer at the very inception of speech development, and the larger one almost immediately thereafter. The defect has been increasing, owing, doubtless, to the unconscious imitation of each other. Neither has been associated with others similarly afflicted or has received a fright or an injury of any kind.

There is no imperfection in the organs of hearing or other sensory organs. I have mentioned the fact that they are subject to catarrhal colds, and this suggests some nasal or pharyngeal lesions. Upon examination, we find little more than a catarrhal condition of the mucous membrane of the nose and throat of the larger boy, but in the other one we find very decided obstructions to respiration and articulation in the form of hypertrophied tonsils. The faucial tonsil on the right side, as you see, is as large as a black walnut, reaching to the median line, and so pressing upon the palate and tongue as to interfere very materially with the articulatory functions of these important organs. The action of the palate is also somewhat impeded by a mass of adenoid tissue in the pharyngeal vault. These hypertrophied glands also form a very decided obstruction to respiration. Not only do they change the character of the breathing, but they prevent the inhalation of a sufficient amount of breath to aërate the blood. The child, as you see, is slightly anæmic, and in striking contrast in this respect to the other one. He is poorly nourished and not so well developed, being lighter in weight by some four or five pounds. In addition to the fact that he stammers more than his brother, the character of his voice is different. It is decidedly thick and lacking in the clearness of tone so noticeable in his brother's voice. He is also restless at night, sleeps with his mouth open, and snores.

With this train of symptoms, the diagnosis is unmistakable, and it is hardly necessary to confirm it by a direct examination of the nose and throat. The patient has obstructive faucial and pharyngeal glandular enlargements, with all the usual symptoms. The following is a brief summary of the points in which he differs from his brother, in whom there are no such glandular enlargements:

He is smaller in stature, is poorly nourished, anæmic, nervous, has difficulty in swallowing, is a mouth-breather, shows less resistance to atmospheric changes, has less confidence in himself, and is more dependent upon others. He also stammers more and began to stammer before his brother.

We have here two most interesting cases of stammering,—the one, a direct result of enlarged tonsils, and the other, a result of association and imitation, with a possible hereditary predisposition to rapid speech in both. Unconscious imitation should be considered also as a possible factor in the cause of the rapid speech, for the boys were much in the company of the relatives mentioned above, whose peculiarities of speech and manner have been reproduced here to a marked extent. It is difficult to say which of the two factors, heredity and imitation, has been the greater. We only know that the imitative faculty is highly developed in these particular cases. It would not be far from the truth, therefore, to suppose that they inherited a nervous temperament, that they acquired by imitation a rapid manner of speaking; that the smaller boy, owing to anatomical irregularities in the fauces and pharynx, was unable in his rapid utterance to co-ordinate the various muscles employed in speech, and thus began to stammer; and that the larger boy, with his strongly developed imitative faculty, acquired the habit of stammering by unconscious imitation. This brings us to the treatment.

In the case of the smaller boy, I shall recommend first of all a reduction of the hypertrophied tonsils. Inasmuch as there is some adenoid tissue in the vault of the pharynx, I shall advise curettage under complete general anæsthesia, and the removal at the same time of the larger faucial gland by means of the MacKenzie tonsillotome. The smaller faucial gland, which, as you may see, is adherent to the palatal pillars, will have to be dealt with according to the method explained by me in a paper published in the second volume of International Clinics, seventh series, and the instruments required for this operation were described in the *Philadelphia Polyclinic* of July 23, 1898.

In cases of this kind in which tonsillar hypertrophies have been a causal factor in stammering, great care should be taken not only to remove obstructing masses of tonsillar tissue, but also to break up any adhesions that may limit the action and interfere with the articulatory functions of the palate and tongue. It must be remembered, also, that hypertrophied tonsils may have an etiological relation to the affection under consideration in an indirect manner through the reflex nervous system. I have seen more than one case in which the gland was not sufficiently large to interfere directly with the function of the articulatory organs, and yet its removal

exerted a decidedly salutary influence upon the speech. It is quite possible that some of the various nervous symptoms manifested in the patient before us may be of reflex origin and dependent directly upon the condition of the faucial and pharyngeal hypertrophies.

Operative measures, then, will constitute the first step in the treatment of the smaller boy. This alone, of course, will not cure the stammering, although, as I have said, these glands which we propose to remove were very probably the cause of the original deviation from normal speech. We now have to deal with the effect of four years of stammering upon the bodily organisms of these two cases. This effect is characterized by peculiar psychophysical commotions which begin even with the thought of speech and develop into more or less violent spasms with each attempt at oral expression.

According to the so-called Lange-James theory, the emotion of fear is not so much the effect that the dreaded object may have upon the mind as it is the effect of a still earlier effect represented by certain bodily commotions; and if these bodily commotions were checked, there would be no more fear. So in these children, if we check the muscular spasm and remove the psychophysical commotions, we shall probably cure the stammering. You will readily see, therefore, that when the peripheral barriers to free speech have been removed, the after-treatment must be along the lines of psychical as well as physical training.

In these cases we shall first of all control the muscular spasm by teaching them how to breathe properly, to produce voice properly, and to articulate this voice into speech, showing them as far as possible exactly how to use some of the more important respiratory, vocalizing, and articulatory muscles, and taking great pains, incidentally, to teach them the correct sounds of the upward of forty elements of our language. Frequent and long-continued repetitions of suitable voluntary exercises will be given them until correct and automatic musculation has been established.

We shall expect this training to have also a marked psychical effect, and to lead to the suppression of the aforementioned abnormal bodily commotions which, as I have said, were originally the result of stammering, and have come to be in a certain sense the cause of the affection. All the treatment must be conducted with a view to making strong psychical impressions. I shall tell this child, for instance, that we expect the operation on his throat to make him talk

in a certain prescribed and deliberate manner; and after the operation I shall explain to them both how impossible it is for them to stammer if they employ the methods which will be given them. We must study in all these cases what some German psychologist has called their "Binnenleben," or "hidden life;" but this is not always easy to do, for the stammerer is generally secretive, and he grows accustomed to silent suffering. In cases of this kind, however, it is not so difficult because there is no hidden life; and if we can secure their full co-operation, as we doubtless shall, I shall expect in the course of a few weeks to show you a complete transformation in their methods of life. Thus their affliction may become in them an "element of strength."

In marked contrast to these two cases is the one I shall now present to you. This man is forty-two years of age and a bricklayer by occupation. He was brought to our clinic by one of your fellow-students, Dr. W. B. Taylor, of McKeesport, Pennsylvania, from whom we have been able to elicit the following complete and interesting history: He has never been able to join satisfactorily in conversation because, with the exception of a few simple names of persons and things, his speech has been entirely unintelligible, and the normal speech of others seemed to be equally unintelligible to him. He was never at a loss for words, which, however, consisted chiefly in a kind of inarticulate jargon; and when occasionally one was able to catch a glimpse of his meaning, it often showed that he was not following the trend of the narration or argument. If, for instance, you asked his name, he would as likely as not try to give you his age or the place of his abode; the reason for this seeming to be not that he could not hear, but that he could not understand, and that he preferred to guess at the purport of your question rather than to think it out. Moreover, he could not go readily from one subject to another. When he had once taken up a line of thought, all the faculties of his mind seemed to be so concentrated upon it that it was difficult to switch him off; and when this was finally accomplished, it would always be done suddenly and with a manifest jarring of the mental machinery. He would say, "Oh!" and proceed along the new line of thought with the same dogged persistency. He could only approximate the correct sound of a few words, and these were nouns. All verbs and other parts of speech were either omitted or so mutilated as to have no resemblance to the original word. No

vowel sound received its full value in articulation, and many of them were little more than a grunt. The consonants were equally defective. R, y, and ng were omitted, and for z and g he substituted d; for sh, ch; for l, n; for c, t; and for hard and soft sounds of th he substituted d and t respectively.

The organs of articulation lacked flexibility. The movements of the palate and tongue were sluggish, and he could not purse his lips to whistle. There was also some anæsthesia of the palate and other portions of the pharynx. This fact has been verified by Dr. Walter J. Freeman, who saw the case with me.

With the foregoing history of marked speech defect, you will be prepared to understand that he cannot read aloud intelligibly, nor, indeed, can he read silently, except to a very limited extent. He recognizes in written and printed language only the few words that he has learned to speak with some little degree of clearness, and these, as before mentioned, are the names of persons and things. It is an interesting and striking fact, however, that he is oftentimes able to get the gist of a newspaper article or a letter and in his own imperfect way communicate it to others. For instance, he took up a morning paper in which was described a fire at Wanamaker's. There were no illustrations of any kind to guide him, and yet, after poring over it for a long time, he convinced Dr. Taylor that he had gathered from the article the principal facts in relation to the fire.

The only possible explanation of this curious feature in the case is the fact that after picking out the few words that he can read, such as fire, Wanamaker, etc., he may be able to construct or guess at the meaning of the entire article. This theory is strengthened by the fact that he has good reasoning powers on subjects with which he is familiar. He is remarkably clear-headed and skilful in all matters relating to his trade, and he commands a higher salary than his fellow-laborers because of his superior workmanship. With the exception of occasionally being able to make his signature, he cannot write at all, but he can copy either written or printed words fairly well.

Now let me recount the early history of this case, which, by the way, is not altogether satisfactory, since we must depend for the facts upon the memory of his attendants during childhood. At the age of sixteen months he fell from a chair, sustaining an injury, which was followed by a severe illness lasting several weeks, during which

time he lay in a kind of stupor. Although our information is not clear on this point, it is quite probable that following the injury there was some paralysis, especially of the muscles employed in deglutition and articulation, for we are told that he had great difficulty in swallowing. On account of the marked nervous element in the case, I have gone over it very thoroughly with Dr. William G. Spiller, who is of the opinion that there is no cerebral lesion, and that the lack of mental development is secondary to and dependent upon his defective use of speech and language. Dr. Spiller agrees also with Dr. B. A. Randall in attributing his lack of speech and language development to a probable defective hearing of certain sounds in the language.

As you see, this is a most interesting case, and one very difficult of diagnosis. We have a history of a fall during early childhood, followed by a severe illness suggestive of some inflammatory action of the brain. Although there was no general paralysis, the pharynx and other articulatory muscles suffered some impairment of function, from which they have not entirely recovered. A careful examination by an expert, Dr. Spiller, fails to reveal any cerebral lesion whatever. There are some peculiar mental traits, but they are such as may be explained as the direct result of a lack of the development of speech and language; these in turn being dependent upon the slight impairment of the peripheral organs of hearing. As the hearing is defective only for certain elements of speech, such as the sibilant and other high-pitched sounds, we may expect some improvement from a systematic course of speech training, and, if our diagnosis be correct, this training will greatly improve his speech, and thus add much to his happiness and to his usefulness in society.

The patient has already been under treatment for several weeks, and, as you will see, he can speak some sentences with great accuracy and clearness. (Here followed some questions which were answered in an intelligible manner; then an exhibition drill was given the patient by Dr. Makuen and his assistants.)

DIPHTHERITIC PARALYSIS; SYPHILIS HEREDITARIA TARDA; ULCER OF THE ANTERIOR PILLAR; POLYPI; ADENOID VEGETATIONS.

CLINICAL LECTURE DELIVERED AT RUSH MEDICAL COLLEGE BEFORE THE MEMBERS AND GUESTS OF THE MISSISSIPPI VALLEY MEDICAL ASSOCIATION.

BY E. FLETCHER INGALS, M.D.,

Professor of Diseases of the Chest, Throat, and Nose, Rush Medical College, etc., Chicago, Illinois.

GENTLEMEN,—This patient, a woman of forty-eight, tells us that she had a swelling of the left tonsil two months ago. This was preceded by chill and fever. The inflamed tonsil was lanced by a physician after the illness had lasted a week. No pus was obtained. The glands back of the jaw were swollen at that time. At present the patient's chief complaint is that, during swallowing, fluids run from the nostrils, and that solid food is swallowed with difficulty, lodging in the laryngopharynx. The patient's pulse is 108; it intermits two or three times in a minute. She has lost flesh, she says. There is no dyspnœa. She has some cough from food entering the larynx.

We have here a paralysis of the pharyngeal muscles, and of those of the soft palate of a nature hard to determine. Paralyses of this sort are not common after ordinary tonsillitis, but do occur. The inference always is that the process has been a diphtheritic one; in fact, diphtheria may attack the follicles of the tonsil alone at times, and, not appearing on the surface as a membrane, be overlooked. The patient states that the tonsil looked white at the time it was inflamed. This may have been merely due to the discharge from the follicles of the tonsil appearing on the surface.

Examination of the throat shows a few yellow follicular plugs in the left tonsil, two of them in the right. The soft palate hangs lower on the left than on the right side, and the uvula is drawn towards the right. A little pus exudes from the upper part of the left tonsil, showing the site of a preceding abscess. A probe enters here to a depth of

three-sixteenths of an inch. Sensation is deficient over the anterior pillar and tonsil on the left side, otherwise it is normal. The larynx shows no paralyses, the epiglottis and vocal chords move normally. We have here a history of partial paralysis of the soft palate and a paretic condition of the pharyngeal constrictors, with some loss of sensation. A small pus sac, insufficiently drained, marking the site of what was a tonsillar abscess, is also a feature of the case. The prognosis for the paralysis is good. Most diphtheritic paralyses recover.

As to treatment, I have found electrical applications of no value for these paralyses. Strychnine in large doses is effective, beginning with one-twenty-fourth of a grain and increasing to one-eighth of a grain three times a day. Give the drug until the physiological effects are obtained, then reduce the dose to just below this. Keep up the treatment for weeks, if needed. The small pus cavity I shall open now with the galvanocautery point, cutting from within out to the surface. Examination shows that the patient's heart and lungs are normal.

Case II.—This girl is eight years old. Her present illness has lasted one and one-half years. Three years ago she had running ears and sore eyes, her attendant stated. The child's health is good with the exception of her diseased throat and nose. As far as known her father has always been healthy. When the child was four years old her mother died, and nothing is known as to her health or the child's when an infant. The little girl has had inflammation of the lungs twice, her attendant says. The child is badly nourished, and has a pulse of 100, soft and regular. Her nose is flattened and the bridge depressed ; this is the so-called saddle nose. There is a crusting discharge from the nostrils. Dr. Freer, who has sent the case to the clinic from the dispensary, tells me that gradually a large part of the hard palate and all of the intranasal bones, including the entire septum, have been extracted through the nares as they separated after necrosis. The ethmoid was also swollen, crowding over into the left orbit. There is a large cleft in the hard palate and the major part of the soft palate is destroyed by an extensive proliferating ulcer. The corneæ show traces of a preceding keratitis. They are slightly cloudy. Inspection of the teeth shows the lateral incisors to be suspicious, as they are irregular in shape and face downward and inward. Though the teeth, therefore, are not characteristic, we have nevertheless two of the

signs of the Hutchinson triad of signs of hereditary syphilis, the otitis media and the keratitis. The third sign is the notched, peg-shaped central incisors. Of course, there can be only one diagnosis in this case, syphilis hereditaria tarda.

Infants are infected during birth, shortly after, or infection may be pregenital. Usually the syphilitic infant shows secondary lesions a few weeks after birth, in the pharynx and on the skin, associated with snuffles and stopped-up nose. There may be no secondary symptoms, and tertiary symptoms may be the only evidence of disease. These occur from one and one-half to ten or twelve years after birth, or as late as puberty. This late appearance of tertiary symptoms, not preceded by secondary ones, constitutes what is called syphilis hereditaria tarda. The prognosis in syphilis hereditaria tarda is bad, much worse than in ordinary tertiary syphilis. The child may be cured by vigorous treatment; but if this is neglected or late in application, the process is apt to extend in spite of our efforts, or if we check the disease it returns. The final outlook in this case is therefore ominous. There can be no regeneration of the destroyed tissue, and if the child lives until puberty more trouble is to be expected at that time. For the local treatment in these cases the best applications are strong tincture of iodine, or sulphate of copper solution, ten to twenty grains to the ounce. The iodine is to be applied daily for from ten days to two weeks, then less often. If the application seems to cause too much reaction, it can be diluted or used less often, or the copper solution substituted for it. As a rule, the ulcer can be checked in three or four weeks. Internally, the iodides are to be given in large doses; nux vomica is also important.

Case III.—This patient has had sore throat for one week. At the beginning of the trouble he says he had a temperature of 103° F., with aching of the bones and pain in the stomach. He has none of these symptoms now, but his appetite remains poor, and he has to force down his food.

The patient is a laborer, smokes a good deal, and chews tobacco. He is a moderate drinker. Seven or eight years ago he had a soft chancre. This has not been followed by any symptoms of general infection. The patient's appearance is good, his skin is normal as to temperature and moisture. His pulse is 96. Examination of the throat shows a small superficial ulcer on the left anterior pillar; this is a quarter of an inch in diameter. On the right side, in the same

situation, there are three small epithelial defects the size of a lentil. The right tonsil is covered with a white film like the result of an application of nitrate of silver. Swabbing shows no ulceration here. Neither history nor appearance enable us to make a certain diagnosis in this case. There is nothing characteristic about the ulcers before us. They are not raised and have no areola, so differ from secondary syphilitic ulcerations. The ulcers are too superficial for tertiary ones; in fact, we have mere epithelial defects and no real ulcerations here. As a positive diagnosis cannot be made at present, it will be necessary to watch the case. Meanwhile, the patient will be given specific treatment, nux vomica and quinine. Locally, a solution of zinc chloride, thirty grains to the ounce, should be applied daily, while the patient uses one of fifteen grains to the ounce in his atomizer. If the case recovers in a week or ten days, the disease is not specific.

Case IV.—This patient has had nasal polypi for six years. He is forty-two years old. His occupation is editorial work; nevertheless, he is out of doors a good deal. He has no pain or headaches. His left nostril is occluded completely. His right nostril has been recently operated upon and examination shows only a small polyp at its upper part. A few days after operation the small polypi that have been crowded up by the larger ones are apt to come down. This has happened in his case. The left nostril is closed up in its posterior one-third, and posterior rhinoscopy shows a large polyp blocking the choana.

Nasal mucous polypi are usually attributed to catarrhal states or colds, but in the majority of cases we can find no cause for their existence. In rare cases they are expelled spontaneously. Polypi enlarge in damp air, so that their possessors say that their noses are at times more free for breathing than at others. Acute rhinitis will also very readily stop up the noses of those afflicted with polypi.

For the treatment of nasal mucous polypi, the only methods worth consideration are surgical ones. Alcohol, lactic acid, chromic acid, and other caustics have been used without success. The surgical methods for the removal of polypi are evulsion with the forceps, curettage, removal with the hot or cold snare, or destruction by the cautery point. Up to eighteen years ago evulsion was used, and for large polypi it proved very effective. The forceps used had long blades. One of these was passed outside of the origin of the polyp and the other within. By turning the blades and by evulsion the

growth was torn away, usually a large bunch at a time, even a handful. The operation was dreadfully painful, as there was no cocaine at that time, and no anæsthetic was used. The middle turbinated body was often torn away. The best modern methods are operation with cold or hot snare. The hot snare is but little used; the cold is the best and most practical, though the cautery point can be used for little polypi too small for the snare.

The snare I use has tubes, straight or of various curves, through which the wire is threaded. Its ends are then attached to a carriage which slides on a rod and can be moved by a milled screw or pulled down by the fingers. The wire used is number five piano-wire. The loop used should be one inch long and one-half an inch wide. For local anæsthesia, I use a four-per-cent. cocaine solution, which I inject well up to the origin of the polypi with a long, hollow silver canula, four inches long, attached to a hypodermic syringe. The solution is injected very slowly, a small drop at a time. A spray of adrenals, one-half of a drachm to the ounce of a saturated solution of boric acid, is of great use as a preliminary, acting as an adjuvant to the cocaine by contracting the blood-vessels and reducing the hemorrhage after the operation. The wire loop is to be passed vertically between the septum and the polyp; then the loop should be turned outward so that it lies horizontally beneath the polyp; by moving it backward and forward it is carried up to the base of the polyp. Draw the loop tight with the fingers, and close down on the polyp by tightening the wire with the milled wheel. Do not cut through the growth with the wire, but, after getting a firm hold on it, tear it off by pulling on the loop. There is an exception to this rule where there are sessile polypi firmly attached to the middle turbinated body. Here it is better to cut through the mass with the wire, as a violent pull might tear off part of the middle turbinated bone. Have swabs ready to mop off the blood and two or three snares wired to avoid delay. A loop can be used several times if straightened with small pliers. Always see the polyp to be removed; blindly groping about for it is of no use. The growth must be seized at its base; this can be determined by the facts that the patient's head follows the pull of the snare as if firmly attached to it; any shaking of the snare shows that the polyp has been seized in its middle and not at its base. The operation is accompanied by little pain and bleeding.

For after-treatment, I use a spray of terebene, twenty minims to

the ounce of albolene ; this tends to prevent the return of the polypi and acts as a mild antiseptic. Where there is loss of the sense of smell it will usually return, but it may take some months before it will come back. A patient of mine who had lost her sense of smell for several years had it return intermittently several months after the operation, for a half-hour at a time. Exertion helped this return,—stair-climbing, for instance. Finally, her sense of smell returned permanently.

Case V.—This child, aged four years, has, as her mother states, been a mouth-breather since her birth. She snores at night and is very restless in her sleep. Her hearing is good, though at one time she had a discharge from the ear. She has no headaches. When she blows her nose she has a pain in her ears. She has normal hearing of the watch in both ears. Her tonsils are a little large, but not enough to cause trouble. Her nares are free. Posterior rhinoscopy shows a tonsil-like growth in the nasopharynx, though not so compact. This growth is called adenoid vegetations, or enlargement of the pharyngeal or Luschka's tonsil. Though this growth would probably atrophy after the age of twelve, still it would not be advisable to await this result, as the child would suffer from all the evils due to mouth-breathing, possible deafness, increased gravity of attacks of diphtheria or scarlatina, the stunted growth due to deficient oxygen supply, and the high-arched, narrow upper jaw with protruding incisors, due to adenoids. In two or three years she would develop a permanently contracted lower thorax. She would show insufficient endurance. The child speaks through the nose, and has the usual stupid look due to adenoid vegetations. The bad effects due to adenoid vegetations used to be attributed to enlarged tonsils alone ; and this is even now often done by general practitioners. In spite of all that has been written on the subject, it is surprising how seldom adenoid vegetations are diagnosed. I shall proceed now with the operation, as anæsthesia is complete.

The proper position in which to place the child for this operation is that of lying on its stomach, with its left arm behind it. The face must be brought well over the side of the table, so that the operation shall not be hindered by its edge. Before performing the adenoid operation, the enlarged tonsils are to be removed. After depressing the tongue and introducing a gag to keep the mouth open as a preliminary, the anterior pillar of the fauces must be separated from the tonsil, if necessary. To do this I insert a palate-hook into the groove

between the tonsil and the anterior pillar, and work it up and down while forcing away the tonsil with the finger,—this tears the tonsil loose. Next I seize the tonsil with the tonsil-forceps, especially getting its lower and back part in the blades. Most of the bleeding in this operation comes from the separation of the anterior pillar, and is insignificant. Then I slide the wire loop of a cold snare over the tonsil-forceps until it reaches the tonsil. To avoid including the uvula in the loop, I have it held by a pair of long rat-tooth forceps. If this is not done, there is great danger of cutting off the uvula with the wire. The wire is tightened down on the tonsil by means of the milled wheel of the snare until the wire cuts through the tissues and the forceps come away.

To remove the Luschka's tonsil, I pass my left forefinger into the mouth and behind the soft palate into the postnasal space. The finger is a guide to the Löwenberg forceps with which I follow it, keeping it behind the finger. Aided by the sense of touch, I tear away the adenoid masses until the nasopharynx is clean, taking care not to injure the Eustachian orifices. These can easily be avoided by the experienced, but might be seized by those not used to feeling them. To complete the operation I pass my nasal bone-forceps through the nostrils into the postnasal space and remove the smaller pieces of adenoid tissue which grow within the choanæ. I have never had a case of serious bleeding after this operation. The operation as described is preferable to the usual one with Gottstein's knife or its modifications, in that it thoroughly removes the adenoid tissue to its bottom and takes away the obstructing small pieces in the posterior nares, without whose removal the operation is of no use to the patient. These small pieces cannot possibly be reached by a ring knife, which only removes the surface of the adenoid vegetations. The operations so commonly performed at present with these scraping-knives are very often followed by relapses, as the lymphoid tissue regenerates in the nasopharynx when not entirely removed. The wounds left in this case will be healed in about eight to ten days. Improvement in breathing will not be very noticeable until a week has passed by.

Dermatology.

MYCOSIS FUNGOIDES.[1]

CLINICAL LECTURE DELIVERED AT THE ST. LOUIS HOSPITAL, PARIS.

BY PROFESSOR H. HALLOPEAU,

Physician to the Hospital and Professor (agrégé) at the University of Paris; Member of the Academy of Medicine, Paris, France.

GENTLEMEN,—There is scarcely a year of my fourteen years' service at the St. Louis Hospital that I have not had the opportunity of studying one or more cases of that comparatively rare affection, mycosis fungoides. I have had under personal observation altogether twenty cases of the disease; so that my lecture of this morning will be mainly drawn from my personal experience. I am glad to have the opportunity thus given me to condense into practical form the observations on these cases that are scattered through the literature and form parts of the transactions of the International Medical Congresses of Paris, Vienna, and Rome.

Mycosis fungoides may for a time remain localized in an initial lesion. In a number of my own cases this was true, and Brocq and Quintaud have observed the same thing. In fact, since my attention has been especially called to it, I have noticed that this localized initial lesion nearly always occurred. The initial lesion may have very different characteristics under different circumstances. It is at times a simple red spot, at others it may be covered with crusts or only with a branny desquamation, at still others it may be ulcerated. In a word, the initial lesion may have any or all of the characteristics of the cutaneous lesions that succeed it in the course of the disease; but it is not always so. I have seen it in a number of my patients as a

[1] Reported by James J. Walsh, Ph.D., M.D.

rounded or oval plaque, of a consistency usually harder than normal, mostly indeed distinctly indurated, often prominent, though at times depressed; chased, as it were, in the surrounding cutaneous tissue. As these lesions are distinctly unlike the subsequent cutaneous lesions of the disease, it is very probable that we have here to do with an initial lesion that corresponds to the chancre in syphilis, or the initial plaque that Brocq has described in pityriasis rosé (pityriasis rubra). This analogy with other initial lesions and the independence of the primary sore of mycosis fungoides, as described, is further substantiated by the observation I have often made, that the scar of the initial lesion may take on an almost keloid character and persist for years after other lesions have disappeared.

The cutaneous manifestations of the disease are most diverse. Everything from simple erythematous patches to large tumors may be found. Often the lesions follow a certain progressive gradation, in this sense that after having remained for some time, often for a long while, strictly superficial in the form of an erythema or an eczema, they develop into vegetative patches or become real tumors. It would seem, then, that we could divide the disease into various stages according to the different forms of the cutaneous lesions, but this developmental gradation does not always exist, and is prone to be eminently irregular. I have seen mycotic erythemata persist almost indefinitely, and at other times have seen tumors develop as the primary cutaneous lesions, without having been preceded by erythemata; while in some cases erythemata succeed the tumors as the secondary stage of the disease.

We cannot, then, give a description of the disease in a single picture. We must study the different forms, in order to see how they develop and combine.

The superficial transient lesions may be erythematous, urticarial, bleby, or purpuric. They may be localized or affect the greater part of the surface of the body. It may be utterly impossible to distinguish them for a time from other lesions of the same kind from other causes. The purpuric patches, for instance, often develop in the midst of erythematous areas. They may be small spots, at first isolated, then perhaps confluent; or they may be broad hemorrhagic splotches, but with nothing to differentiate them from hemorrhagic lesions from other causes. We have had here this winter cases where the erythematous or so-called erysipelatous forms have developed late in the

affection. They may then be circumscribed, as in one of our patients this morning, who has had a series of erysipelatous patches develop in from twenty-four to forty-eight hours on one of his legs on two separate occasions. The patches did not have the raised borders so characteristic of genuine erysipelas, but were simply separated from each other by patches of apparently healthy skin. These were not, however, areas of simple erythema, since they were accompanied by febrile temperature. In a patient with characteristic mycosis fungoides in the form of huge vegetating, ulcerative tumors of the back, I have seen a series of patches of erythema develop on the legs that I could not help but attribute to the mycosis.

The superficial persistent forms are even more remarkably polymorphous. They may be erythematous, eczematous, lichenoid, bullous, hemorrhagic, and ulcerative.

The persistent erythematous lesions develop like the transient forms, these often being to all appearance their precursors, and usually attack limited areas. They may, however, invade the whole surface of the body and persist for years, when they constitute a special form of the disease, which has been especially studied here at the St. Louis. My first case presented at the First International Congress of Dermatology, with the diagnosis of scarlatiniform lymphodermia, in the beginning undoubtedly of a generalized mycosis fungoides, became celebrated under the name of "the red man of l'Hôpital St. Louis."

This form is especially interesting. The erythrodermia may occur first or simultaneously with a pruritus. It may have been preceded for months or years by divers other mycotic lesions. The redness nearly always invades the larger part of the skin surface, though it may not become generalized at first. The patient first observes some red spots whose appearance coincides with intense pruritus. It is only after the lapse of a couple of days, sometimes after weeks, that the red spots spread, to finally become almost universal. At times the patient thinks that some accidental irritation is the cause of it. One of our cases attributed it to too hot a bath, another to atropine which he was using at the moment for another purpose. The erythrodermia, or better, erythrodermatitis, is accompanied by a certain thickening of the skin, an exaggeration of its folds and of its consistency, and at times also by roughness and pigmentary anomalies.

The redness may be very different in different individuals, or in the same individual at different times. Usually the patches are

regular. The color intensity is extremely variable. It may have the greatest similarity to scarlet fever, but it may be cyanotic, or dark, or light pink, or bluish-red, or strawberry, or of sombre erysipelatous hue, or wine-colored. The redness disappears more or less completely under the pressure of the finger.

The thickening of the skin and the exaggeration of its natural folds lead to the formation of "quadrillages," patches surrounded by furrows recalling the process of "lichenization." The skin seems to become too big for the underlying parts, and it often forms large folds along the sides of the trunk. These folds form variable pads, separated by deep furrows. When the skin is lifted up in the fingers, a special sensation is experienced to which Kaposi called attention, and very rightly, as pathognomonic of the disease.

Besides the thickening, an induration of the skin ensues. A bistoury is scarcely able to penetrate it in cases where a portion of tissue is desired for a biopsy, and a needle is bent or blunted when used to obtain the blood for study. It is very exceptional, though we had it in one case here at the St. Louis, to find the lines of the face obliterated. Œdema is also rare. No impression can usually be produced by the pressure of the finger, and its imprint does not remain. Desquamation is usually absent, unless after the application of topical irritants, when there are light, branny scales. In one of our cases, however, there was an abundant desquamation, or rather exfoliation, of the epiderm, which continued for several weeks, and presented the ordinary characters of the desquamation that follows scarlet fever.

The nails usually remain intact, though they may be marked by transverse ridges that indicate trophic troubles. This is all the more remarkable, as the hair usually suffers severely. Alopecia sets in and the hair of the pubes and axillæ falls wholly or in part. The alopecia is seldom complete; there remain some few scattered atrophic hairs.

All the glands accessible to observation are enlarged. No case has been reported in which they were not affected. They are usually immensely enlarged, constituting easily visible tumors. The involvement of the lymph-glands in the parotid region may deform the countenance and give the patient a peculiar appearance. In no reported case have the glands suppurated.

One of the most troublesome symptoms of the disease, and, at the same time, one of its essential characteristics, is the pruritus. It is incessant, but there are crises of exaggeration, especially after a meal.

It is often intense from the very beginning, and persists throughout the course of the affection. It troubles the patients night and day, and often disturbs their sleep. The tendency to scratch is irresistible, and patients wear out their nails in the vain effort to get relief. I have seen a patient's nails misshapen and varnished looking, their free edges with an ivory polish, from the friction of the epidermis. He had to procure a brush to satisfy his desire to scratch. This intense itchiness existed in almost all of my cases.

Secondary alterations of the skin result,—excoriations, serous exudation, ecchymoses. In some patients it would seem as though these lesions were more easily produced, because of changes in the cutaneous capillaries. One does not, however, see the crusty papules of prurigo. It is probable that we can attribute to the carrying of infectious material during the scratching process the occurrence of ecthymatous pustules, which have been noted on various occasions in a number of our cases.

The temperature of the surface of the body may be above normal. At times there are sweating attacks. Usually perspiration is exaggerated.

Another form of the eruption is the lichenoid, which appears in the form of small circular spots, slightly projecting above the healthy tissue, though it may require careful observation to notice this prominence. At times these small elevations exist all over the body, giving an *état mamelonné*. In the centre of each prominence a hair-follicle is found. We have noticed, also, little projections, usually very numerous and resembling little warts, of the color and consistency of the normal skin in the neighborhood. We have found in certain cases, on different parts of the person, but more especially on the face and back, small miliary nodules of a whitish-yellow color, resembling the nodules produced by closure of the sweat-glands, and which doubtless originate in this way.

On nearly all patients pigmentary areas developed, disseminated over the surface of the body, and especially numerous on the ears and the backs of the hands. Some of them projected slightly. They varied in size from that of the head of a pin to that of a grain of barley. Their form was irregularly round; their color varied from light to deep brown, almost black in some cases.

The thickening of the skin, the effacing or the exaggeration of its natural folds, and the enlargement of the glands can produce con-

siderable deformity. The most noticeable deformities are those of the face and head. Frequently ectropion develops. The swelling of the retromaxillary glands may give the head the so-called pear shape.

Generally the mucous membranes are not affected. I have seen several times, however, the labial mucous membrane, at its line of union with the skin, assume a dark whitish discoloration in which occurred small violaceous spots ; there existed also on the right edge of the tongue and on the inner surface of the lips spots that resembled ecchymoses. In one case I saw the development of a keratoconjunctivitis followed by ulceration of the cornea and persistent opacities.

We have said that the erythrodermia may exist at the same time as the neoplastic form of the mycosis fungoides, though it usually precedes, and may come after. When it is itself persistent, it may run a most variable course, with alternate phases of exaggeration and regression. Variations in the intensity of the discoloration of the patients may occur even from day to day. With the accentuation of the redness the feeling of constriction and the itchiness grow worse, and then lessen as the redness pales. Sudden variations of temperature may occur, analogous to and as equivalents, so to speak, of the rapidly developing attacks of bullous erythema, or of neoplastic fungosities in other cases. It is extremely rare to see the redness disappear completely, though it may in parts give place to exaggerated pigmentation.

A very striking phenomenon that may develop is the regression of the erythrodermia in certain places and the occurrence of nummular plaques entirely without color, in striking contrast to the intense redness all around them. These decolorized patches are even paler than the normal skin. They represent a tendency that is present in certain cases of the disease to a retrograde evolution of the disease, which may lead to its complete disappearance.

The eczematous form of the disease is sooner followed or oftener accompanied by the fungoid lesions of the disease, so that it has always attracted more attention. The red vesicular exudative and crusty patches that characterize it have all the notes of ordinary eczema, and it has so far been impossible to distinguish them by their objective symptoms alone. The eczematous symptoms are accompanied, like the erythema just described, by intense pruritus, but without prurigo. It has, too, the multiple glandular enlargements

and, later, the lichenoid thickening of the skin, which enables us to diagnose mycosis.

The *lichen form* may occur simultaneously with the specific eczema, or may persist after the development of the mycotic tumors. The papular lesions we have spoken of already, under the erythematous form, as projecting at times scarcely enough above the surface to be visible as such, palpable at the *état mamelonné*, but betrayed only by the irregularity of the cutaneous surface that they produce. They may occur in groups the size of a silver three-cent piece, or of a silver dollar. The unevenness of the surface constitutes the differential diagnostic sign between a pure erythrodermia and the mycotic condition.

The *bullous form* may be accompanied at intervals by blebs which affect the whole body and recall strikingly dermatitic herpetiformis. The blebs may originate over macules in the erythematous form, in more or less prominent papules, or on the mycotic neoplastic lesions. They may, however, occur on parts absolutely unaffected before. Like the erythema, they may be associated with variations of temperature. In a number of cases they occurred in patients affected by deep ulcerative lesions. In such cases it may be that the absorption of mycotic toxines elaborated during the ulcerative tissue-destruction was the direct cause. This would not explain the occurrence of bullæ, however, in cases where there was no ulceration, and yet they are not so infrequent.

The *pustular form* seems usually to be a further stage of the bullous form, due perhaps to the infection of the blebs secondarily with pus micro-organisms.

The *hemorrhagic form*. It is not unusual to see in the course of the erythematous form of mycosis fungoides a slight injury, perhaps not more than a pinch, followed by an effusion of blood into the cutaneous tissues. The erythema is often complicated by purpura, which usually manifests itself on the lower extremities. In exceptional cases the hemorrhages may be of large size, and may occur as well in the upper part of the body, especially in the face. The countenance may present a dark discoloration all over. The hemorrhages have a tendency to recur; they leave deep pigmentation after them, and they add to the cachexia already developing.

The *vegetative* or *fungoid forms* are nearly always subsequent to the other forms. We have traced the development of the erythro-

dermia into the multipapular stage,—the *état mamelonné*,—and have noted the occurrence of the psoriasis and lichenoid forms. At a given moment, sometimes ten years after the beginning of the affection, these lesions become more pronounced. The prominences take on sinuous contours, recalling in shape urticaria perstans. At times it is the lichenoid appearance that becomes exaggerated, and the lesions may take on the appearance of condylomata, more or less extensive. Especially in the inguinal and axillary folds are the lesions most marked, though they may occur in the fossette under the chin.

On the head and in the extremities the fungoid lesions are usually more or less irregularly round. They are sometimes compared to macaroons (sweet cakes), are usually of a dark-red color and rather soft consistence, and may have polycyclic contours. In them there occurs an infiltration of the tissues that may be either diffuse or in the form of definite tumors. These tumors may be arranged in curves, circles, or parts of circles, or in parabolic form; they may be isolated or confluent. The cutaneous lesions may recall sycosis, for they are often of a red color, paler in the centre than at the edges, and surrounded by a slight epidermal elevation and an areola of dark red. They may retrograde and leave but a dark-brown spot, or they may ulcerate, often as a consequence of the rupture of a bleb.

The ulceration occupies more especially the centre of the eruptive lesions, but may invade them in their entirety. We find all varieties, from slight tubercular ulcers to huge patches of ulceration measuring several centimetres in diameter. I have seen ulcerations that spread over most of the body, and gave rise to hectic fever, very probably produced by the septic material they furnished for absorption. The ulcerations are covered either by pus or by sanious detritus. They may become hemorrhagic or confluent, and form large areas with serpiginous borders. At times they heal in the centre but continue to spread at the periphery, and may be surrounded by a raised border. A cockade form has also been noted.

The ulcerations may leave behind them huge decolorized cicatrices, serpiginous in form and surrounded by hyperpigmented zones, analogous to those presented by syphilitic lesions. Where the curved lesions cross one another in this affection, however, they are not interrupted, as in syphilis, by a sort of interference, but persist in their totality. The glandular enlargements in the ulcerative form may be inconsiderable, despite the severity and extent of the lesions.

The *fungoid form* develops readily into the tumor form, and there is between the two only a matter of degree.

The *tumor form* may, with Vidal and Brocq, be distinguished into two groups. The most frequent group is that of tumors developing subsequently to the superficial lichenoid lesions, which we have described, and in which they represent the third period of the disease. Tumors belonging to the other group may develop, usually in very limited number, either on the healthy skin or on the erythematous patches. Though there is a certain family resemblance in the tumors, they present great variability in their mode of evolution. It is the tumors that attracted the attention of the first observers of the disease and led to the name mycosis, which does not apply properly to the superficial forms of the disease. The resemblance to a mushroom, not any theory as to its fungoid origin, was the reason for the name.

The tumors develop from the slight elevations of the lichenoid eruption in most cases, but their size may be enormous. I have seen a patient with a huge tumor on his back that compelled him to stoop in carrying it, so heavy was the load; and tumors the size of a child's head have often been reported. The skin over the tumor is uneven and covered with fungous vegetations. Their color varies from bright red to dark red or dark bluish brown. They are nearly always definitely circumscribed, separated from neighboring parts by a line of demarcation, beyond which in places, however, advancing lesions can be seen to have invaded. Their borders are sometimes polycyclic, when they will always be found to have been formed of two or more lesions fused together.

Their tendency is to extend eccentrically, and their progress can be watched in the formation of a zone of erythematous thickening of the skin that surrounds the tumor proper. The zone of invasion may exist all around the periphery of the neoplasm to a breadth of several centimetres. This is not merely the usual zone of reactive hyperæmia, but is a real zone of infiltration representing the first stadium of neoplasia. As the tumor extends at the periphery it may be healing in the centre, with the production of a circular ridge raised above the skin within and without.

This ridge of pathological tissue, as well as the whole tumor, may disappear completely, leaving no trace, though it is more usual to find at the site of the tumor after its regression a thickened area of

skin, usually pigmented a deep brown,—the neoplasm has been replaced by a simple brown spot. The tumors may be the site of hemorrhages which give them the appearance of melanotic tumors. Quinquad has reported a case where the whole face was the seat of a deep-brown, almost black, discoloration.

Very often the tumors become the site of ulceration. The loss of substance may be multiple and of most variable dimensions. The ulcers secrete a purulent fluid, and their walls are usually covered with a sanious, violaceous detritus. During periods of repair they become the seat of unhealthy, luxuriant granulations. I have seen miliary translucent nodules occur in the walls of the ulcer, not unlike miliary tubercles during their earliest stages. The ulceration is at times the consequence of the partial gangrene of the tumor. This gangrene may be superficial, but it may include nearly the whole mass of the tumor.

I showed you some time ago a case in which I removed a sphacelated mass, larger than a hen's egg, of a dirty grayish-brown color and intensely fetid odor. After such an elimination the gangrenous process may not be at an end. The adjacent parts become gangrenous, the skin and its tissues are soon passed, and as the process goes deeper, it may invade even the bony skeleton and cause partial necrosis of bone. Such tumors may run their course without involvement of the lymph-glands and may cause no pruritus. This is a double contrast with the erythematous and eczematous lesions, but the coincidence of the lesions and the similarity of the results of histological examination show that they are due to the same morbific principle.

From what we have said, you will be able to judge that the clinical picture presented by mycosis fungoides may be a most variable one. In the erythematous form, at first sight, the patient resembles a scarlatina case; but a closer examination will always disclose deeper alterations in the skin. At times its folds are thicker, and it seems too large for the underlying structures; at times it is of almost woody consistency, and cannot be raised into folds; often a double ectropion gives to the face a peculiar look; the hair is scanty, thin, and atrophic; the glandular enlargements are multiple and often of immense size. The patient scratches himself with frenzy. The pruritus and the redness grow worse at intervals, and there are times when sweating is profuse. Desquamation is sometimes absent, sometimes branny, and occasionally in large flakes. Exacerbations come from

time to time in the condition, and are accompanied by fever. Tumors may develop after years of the affection, or at the very beginning may be isolated, or cover most of the surface of the body. After they begin to ulcerate a number of variations of the external appearances may occur as a consequence of secondary infection with pus cocci. This is accompanied by a hectic fever which is extremely persistent.

The confluence of the neoplastic lesions on the face may cause the most profound alteration of the features. I show you here one of the wax models from the St. Louis Museum, which recalls the leonine masque of patients attacked by tubercular leprosy. It is covered by hemispherical, nipple-like tumors, of bluish or blackish hue, and partly ulcerated. The lips have been transformed into two prominent ridges.

The tumors may be generally distributed over the body, but they may be limited in number. At times, in either case, one or more of them may take on a malignant character. The ridge of tissue at its periphery may be continually invading healthy tissue, while the centre becomes gangrenous. The gangrene may strike in ever deeper and deeper. We had here, some years ago, a case in which almost the whole parietal surface of the skull was invaded, and the destruction of the cheek, the temple, the orbit, and the ear made a most hideous picture.

As to *prognosis*, I may say, only very exceptionally does the disease terminate in recovery. It may last for years, especially while only the superficial lesions exist, the erythema, etc.; but ulcerations and gangrene begin, fever lights up with evening exacerbations, and each neoplastic ulcer becomes a new focus of infection. I have seen the excision of a huge gangrenous tumor cause a fall of temperature that persisted for some weeks; but in most cases this gives but passing relief. New ulcerations and gangrene set in; the patients emaciate rapidly, their appearance changes, their tissues dry, the tongue becomes parched, and they succumb to marasmus.

As to *diagnosis*, we may say, in the early stages it is almost impossible to diagnose the disease with any assurance. When the erythema begins to show elevations above the surface and is accompanied by enlarged glands and pruritus, then there are good grounds for the suspicion that the case is mycosis fungoides. The generalized erythema is not so hard to trace to its real cause, for its persistency, with

some of the signs mentioned above, are enough to lead to investigation as to the possible existence of mycosis. A not to be despised help to diagnosis are the changes in the nails brought about by the scratching during the intense pruritus.

Isolated tumors may be confounded with sarcoma, but the tendency to remission, or even to regression, their partial disappearance even at times, with their advance by means of an elevated border that recalls the setting of a watch-crystal, are important differential diagnostic points. If doubt still remains, it must be settled by histological examination of an excised bit of tumor, when the presence or absence of the characteristic sarcoma cells will easily decide the question.

Kaposi described, under the name pernicious lymphodermia, a type of disease in which lesions eczematous in appearance are accompanied by tumefaction and thickening of the skin, with nodular infiltration of the subcutaneous tissues. These may ulcerate and the lymph-glands and the spleen enlarge, and leukæmia develops. This presents many points of analogy with mycosis; but a case which I had the opportunity to study recently, with M. Laffitte, made us think, with Kaposi, that there may exist a disease having some similarities, yet essentially different to and independent of mycosis. In our case the absolute absence of cutaneous involvement over the enlarged lymph-glands and the failure to find plasma cells, which occur almost constantly in mycosis, were the differential points. It would seem, then, that the cutaneous changes accompanying leukæmia differ from the mycotic symptoms.

As to the cause of mycosis fungoides we are as yet absolutely in the dark. Its mode of development and the genesis of its multiple lesions leave no doubt of its infectious nature; but all efforts to find the parasite so far have been unavailing. Inoculation has failed to produce the disease in the monkey.

We are unable to proceed effectively against this unknown source of infection. All parasiticides have failed, and when regression does occur, it is one of the capricious moods of the disease, with its well-known tendency to remit at times spontaneously, and not the result of the medication that has been employed. The physician has his place, however; and the main indication in the cases seems to be the excision of the tumors when they are not too large or too numerous. Especially is this indication present when they have ulcer-

ated. I have seen, as I have said, the removal of large ulcerating tumors followed almost immediately by a drop in febrile temperature, due to infective absorption, that had persisted for weeks, despite the use of antipyretics. By excision a certain amount of infective material is removed, and that much less opportunity for the development of secondary infection is left. The chance for the development of very large tumors is lessened, and there often is not a local relapse at the place of excision. It is clear to my mind, then, that surgical treatment may play a much greater *rôle* in effective therapeutics of the disease than has been hitherto imagined.

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